

## Supporting Information

### Design, synthesis and biological evaluation of 6-(imidazo[1,2-a]pyridin-6-yl)quinazoline derivatives as anticancer agents via PI3K $\alpha$ inhibition

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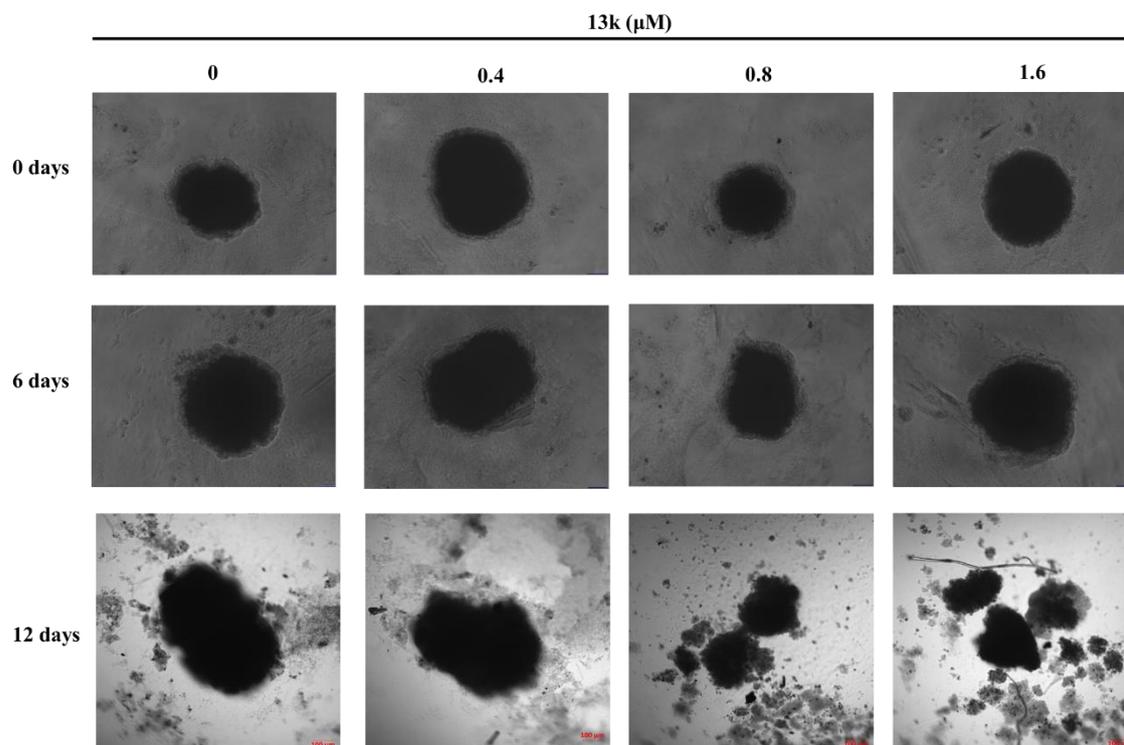
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## 1. Supplementary diagram of 3D spheroid cell inhibition assay



**Figure 1.** Effect of **13k** on HCC827 spheroid formation. Photographs were taken on days 0 and 6 with an inverted microscope (Olympus CKX53, JPN). After 12 days, pictures were taken with a ZEISS LSM 900 Airyscan 2 confocal laser scanning microscopy (ZEISS, GER). Scale bar: 100  $\mu\text{m}$ .

## 2. Synthesis of compounds 10a-10u

### 2.1. General experimental protocol for the preparation of intermediates **5a-5q**.

#### 2.1.1. Steps for the preparation of 6-iodo-N-(4-methoxybenzyl)quinazolin-4-amine (**5a**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 4-methoxybenzylamine (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated  $\text{Na}_2\text{CO}_3$  solution. The organic phase was dried over anhydrous  $\text{Na}_2\text{SO}_4$  and rotary dried under vacuum to obtain 6-iodo-N-(4-methoxybenzyl)quinazolin-4-amine **5a** as a white solid (77.0 % yield). ESI-MS:  $m/z$  392.1 $[\text{M} + \text{H}]^+$ .

2.1.2. Steps for the preparation of N-(cyclopropylmethyl)-6-iodoquinazolin-4-amine (**5b**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and aminomethylcyclopropane (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain N-(cyclopropylmethyl)-6-iodoquinazolin-4-amine **5b** as off-white solid (91.2 % yield). ESI-MS: m/z 326.0 [M+H]<sup>+</sup>.

2.1.3. Steps for the preparation of N-(4-fluorobenzyl)-6-iodoquinazolin-4-amine (**5c**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 4-fluorobenzylamine (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain N-(4-fluorobenzyl)-6-iodoquinazolin-4-amine **5c** as off-white solid (77.8 % yield). ESI-MS: m/z 380.0 [M+H]<sup>+</sup>.

2.1.4. Steps for the preparation of 6-iodo-N-(4-(trifluoromethyl)benzyl)quinazolin-4-amine (**5d**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 4-(trifluoromethyl)benzylamine (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain 6-iodo-N-(4-(trifluoromethyl)benzyl)quinazolin-4-amine **5d** as off-white solid (86.1 % yield). ESI-MS: m/z 430.2 [M+H]<sup>+</sup>.

2.1.5. Steps for the preparation of 6-iodo-N-(3-methylbenzyl)quinazolin-4-amine(**5e**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 3-methylbenzylamine (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain 6-iodo-N-(3-methylbenzyl)quinazolin-4-amine **5e** as pale yellow solid (94.5 % yield). ESI-MS: m/z 376.2 [M+H]<sup>+</sup>.

2.1.6. Steps for the preparation of N<sup>1</sup>,N<sup>1</sup>-diethyl-N<sup>2</sup>-(6-iodoquinazolin-4-yl)ethane-1,2-diamine (**5f**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and N,N-Diethylethylenediamine (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain N<sup>1</sup>,N<sup>1</sup>-diethyl-N<sup>2</sup>-(6-iodoquinazolin-4-yl)ethane-1,2-diamine **5f** as pale yellow oily substance (91.0 % yield). ESI-MS: m/z 371.0 [M+H]<sup>+</sup>.

2.1.7. Steps for the preparation of 6-iodo-N-(2-methylbenzyl)quinazolin-4-amine (**5g**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 2-methylbenzylamine (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain 6-iodo-N-(2-methylbenzyl)quinazolin-4-amine **5g** as pale yellow solid (95.3 % yield). ESI-MS: m/z 376.0 [M+H]<sup>+</sup>.

2.1.8. Steps for the preparation of 6-iodo-N-(pyridin-2-ylmethyl)quinazolin-4-amine (**5h**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 2-Picolylamine (2.4 mmol)

was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain 6-iodo-N-(pyridin-2-ylmethyl)quinazolin-4-amine **5h** as pale yellow solid (92.1 % yield). ESI-MS: m/z 385.2 [M+Na]<sup>+</sup>.

2.1.9. Steps for the preparation of N-(2-fluorobenzyl)-6-iodoquinazolin-4-amine (**5i**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 2-fluorobenzylamine (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain N-(2-fluorobenzyl)-6-iodoquinazolin-4-amine **5i** as off-white solid (61.9 % yield). ESI-MS: m/z 380.0 [M+H]<sup>+</sup>.

2.1.10. Steps for the preparation of N-(3-fluorophenyl)-6-iodoquinazolin-4-amine (**5j**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 3-fluoroaniline (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain N-(3-fluorophenyl)-6-iodoquinazolin-4-amine **5j** as pale yellow solid (85.3 % yield). ESI-MS: m/z 336.1 [M+H]<sup>+</sup>.

2.1.11. Steps for the preparation of N-(3,5-dimethoxyphenyl)-6-iodoquinazolin-4-amine (**5k**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 3,5-dimethoxyaniline (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub>

and rotary dried under vacuum to obtain N-(3,5-dimethoxyphenyl)-6-iodoquinazolin-4-amine **5k** as pale yellow solid (90.7 % yield). ESI-MS: m/z 408.2 [M+H]<sup>+</sup>.

2.1.12. Steps for the preparation of 6-iodo-N-(pyridin-3-ylmethyl)quinazolin-4-amine (**5l**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 3-(aminomethyl)pyridine (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain 6-iodo-N-(pyridin-3-ylmethyl)quinazolin-4-amine **5l** as pink solid (94.2 % yield). ESI-MS: m/z 385.2 [M+H]<sup>+</sup>.

2.1.13. Steps for the preparation of N-(2,3-difluorophenyl)-6-iodoquinazolin-4-amine (**5m**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 2,3-difluoroaniline (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain N-(2,3-difluorophenyl)-6-iodoquinazolin-4-amine **5m** as off-white solid (93.6 % yield). ESI-MS: m/z 384.1 [M+H]<sup>+</sup>.

2.1.14. Steps for the preparation of 6-iodo-N-methyl-N-(p-tolyl)quinazolin-4-amine (**5n**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and N-methyl-p-toluidine (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain 6-iodo-N-methyl-N-(p-tolyl)quinazolin-4-

amine **5n** as pale yellow solid (94.0 % yield). ESI-MS: m/z 376.0 [M+H]<sup>+</sup>.

2.1.15. Steps for the preparation of N-ethyl-6-iodo-N-phenylquinazolin-4-amine (**5o**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and N-ethylaniline (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain N-ethyl-6-iodo-N-phenylquinazolin-4-amine **5o** as pale yellow solid (95.7 % yield). ESI-MS: m/z 376.0 [M+H]<sup>+</sup>.

2.1.16. Steps for the preparation of 6-iodo-N-(1H-pyrazol-3-yl)quinazolin-4-amine (**5p**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 3-aminopyrazole (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain 6-iodo-N-(1H-pyrazol-3-yl)quinazolin-4-amine **5p** as white solid (91.5 % yield). ESI-MS: m/z 338.1 [M+H]<sup>+</sup>.

2.1.17. Steps for the preparation of 6-iodo-N-((tetrahydro-2H-pyran-4-yl)methyl)quinazolin-4-amine (**5q**).

A mixture of 4-chloro-6-iodoquinazoline (2 mmol) and 4-(aminomethyl)tetrahydro-2H-pyran (2.4 mmol) was added to isopropanol and refluxed at 60 °C for 2 h under argon protection. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to obtain 6-iodo-N-((tetrahydro-2H-pyran-4-yl)methyl)quinazolin-4-amine **5q** as white solid (90.1 % yield). ESI-MS: m/z 392.0 [M+H]<sup>+</sup>.

2.2. General experimental protocol for the preparation of intermediates **7a-7o**

2.2.1. Steps for the preparation of 6-iodo-N-(4-methoxybenzyl)quinazolin-4-amine

**(7a).**

6-iodo-N-(4-methoxybenzyl)quinazolin-4-amine **5a** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford white solid 6-(6-aminopyridin-3-yl)-N-(4-methoxybenzyl)quinazolin-4-amine **7a** (66.6 % yield), ESI-MS: m/z 358.1 [M + H]<sup>+</sup>.

2.2.2. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-(cyclopropylmethyl)quinazolin-4-amine (**7b**).

N-(cyclopropylmethyl)-6-iodoquinazolin-4-amine **5b** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford off-white solid 6-(6-aminopyridin-3-yl)-N-(cyclopropylmethyl)quinazolin-4-amine **7b** (71.2 % yield), ESI-MS: m/z 291.1 [M + H]<sup>+</sup>.

2.2.3. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-(4-fluorobenzyl)quinazolin-4-amine (**7c**).

N-(4-fluorobenzyl)-6-iodoquinazolin-4-amine **5c** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of

Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford off-white solid 6-(6-aminopyridin-3-yl)-N-(4-fluorobenzyl)quinazolin-4-amine **7c** (92.2 % yield), ESI-MS: m/z 246.1 [M + H]<sup>+</sup>.

2.2.4. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-(4-(trifluoromethyl)benzyl)quinazolin-4-amine (**7d**).

6-iodo-N-(4-(trifluoromethyl)benzyl)quinazolin-4-amine **5d** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford off-white solid 6-(6-aminopyridin-3-yl)-N-(4-(trifluoromethyl)benzyl)quinazolin-4-amine **7d** (85.7 % yield), ESI-MS: m/z 396.1 [M + H]<sup>+</sup>.

2.2.5. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-(3-methylbenzyl)quinazolin-4-amine (**7e**).

6-iodo-N-(3-methylbenzyl)quinazolin-4-amine **5e** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford off-white solid 6-(6-aminopyridin-3-yl)-N-(3-methylbenzyl)quinazolin-4-amine **7e** (73.4 %

yield), ESI-MS:  $m/z$  342.1  $[M + H]^+$ .

2.2.6. Steps for the preparation of  $N^1$ -(6-(6-aminopyridin-3-yl)quinazolin-4-yl)- $N^2,N^2$ -diethylethane-1,2-diamine (**7f**).

$N^1,N^1$ -diethyl- $N^2$ -(6-iodoquinazolin-4-yl)ethane-1,2-diamine **5f** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and  $K_2CO_3$  (4.6 mmol) were added to 15 mL of solvent [ $V_{(1,4\text{-dioxane})}:V_{(water)} = 4:1$ ]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of  $Pd(dppf)Cl_2$ . The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford brown solid  $N^1$ -(6-(6-aminopyridin-3-yl)quinazolin-4-yl)- $N^2,N^2$ -diethylethane-1,2-diamine **7f** (82.9 % yield), ESI-MS:  $m/z$  359.1  $[M + H]^+$ .

2.2.7. Steps for the preparation of 6-(6-aminopyridin-3-yl)- $N$ -(2-methylbenzyl)quinazolin-4-amine (**7g**).

6-iodo- $N$ -(2-methylbenzyl)quinazolin-4-amine **5g** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and  $K_2CO_3$  (4.6 mmol) were added to 15 mL of solvent [ $V_{(1,4\text{-dioxane})}:V_{(water)} = 4:1$ ]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of  $Pd(dppf)Cl_2$ . The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford off-white solid 6-(6-aminopyridin-3-yl)- $N$ -(2-methylbenzyl)quinazolin-4-amine **7g** (76.3 % yield), ESI-MS:  $m/z$  342.1  $[M + H]^+$ .

2.2.8. Steps for the preparation of 6-(6-aminopyridin-3-yl)- $N$ -(pyridin-2-ylmethyl)quinazolin-4-amine (**7h**).

6-iodo- $N$ -(pyridin-2-ylmethyl)quinazolin-4-amine **5h** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and  $K_2CO_3$  (4.6

mmol) were added to 15 mL of solvent [ $V_{(1,4\text{-dioxane})}:V_{(\text{water})} = 4:1$ ]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford yellow solid 6-(6-aminopyridin-3-yl)-N-(pyridin-2-ylmethyl)quinazolin-4-amine **7h** (70.6 % yield), ESI-MS: m/z 328.1 [M + H]<sup>+</sup>.

2.2.9. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-(2-fluorobenzyl)quinazolin-4-amine (**7i**).

N-(2-fluorobenzyl)-6-iodoquinazolin-4-amine **5i** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [ $V_{(1,4\text{-dioxane})}:V_{(\text{water})} = 4:1$ ]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford off-white solid 6-(6-aminopyridin-3-yl)-N-(2-fluorobenzyl)quinazolin-4-amine **7i** (86.3 % yield), ESI-MS: m/z 346.1 [M + H]<sup>+</sup>.

2.2.10. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-(3-fluorophenyl)quinazolin-4-amine (**7j**).

N-(3-fluorophenyl)-6-iodoquinazolin-4-amine **5j** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [ $V_{(1,4\text{-dioxane})}:V_{(\text{water})} = 4:1$ ]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a

column chromatography on silica with dichloromethane/methanol to afford pale yellow solid 6-(6-aminopyridin-3-yl)-N-(3-fluorophenyl)quinazolin-4-amine **7j** (77.6 % yield), ESI-MS:  $m/z$  332.1  $[M + H]^+$ .

2.2.11. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-(3,5-dimethoxyphenyl)quinazolin-4-amine (**7k**).

N-(3,5-dimethoxyphenyl)-6-iodoquinazolin-4-amine **5k** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and  $K_2CO_3$  (4.6 mmol) were added to 15 mL of solvent [ $V_{(1,4\text{-dioxane})}:V_{(water)} = 4:1$ ]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of  $Pd(dppf)Cl_2$ . The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford yellow solid 6-(6-aminopyridin-3-yl)-N-(3,5-dimethoxyphenyl)quinazolin-4-amine **7k** (81.3 % yield), ESI-MS:  $m/z$  396.1  $[M + Na]^+$ .

2.2.12. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-(pyridin-3-ylmethyl)quinazolin-4-amine (**7l**).

6-iodo-N-(pyridin-3-ylmethyl)quinazolin-4-amine **5l** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and  $K_2CO_3$  (4.6 mmol) were added to 15 mL of solvent [ $V_{(1,4\text{-dioxane})}:V_{(water)} = 4:1$ ]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of  $Pd(dppf)Cl_2$ . The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford off-white solid 6-(6-aminopyridin-3-yl)-N-(pyridin-3-ylmethyl)quinazolin-4-amine **7l** (67.6 % yield), ESI-MS:  $m/z$  329.1  $[M + H]^+$ .

2.2.13. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-(2,3-difluorophenyl)quinazolin-4-amine (**7m**).

N-(2,3-difluorophenyl)-6-iodoquinazolin-4-amine **5m** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford white solid 6-(6-aminopyridin-3-yl)-N-(2,3-difluorophenyl)quinazolin-4-amine **7m** (88.7 % yield), ESI-MS: m/z 352.1 [M + Na]<sup>+</sup>.

2.2.14. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-methyl-N-(p-tolyl)quinazolin-4-amine (**7n**).

6-iodo-N-methyl-N-(p-tolyl)quinazolin-4-amine **5n** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford pale yellow solid 6-(6-aminopyridin-3-yl)-N-methyl-N-(p-tolyl)quinazolin-4-amine **7n** (79.8 % yield), ESI-MS: m/z 342.1 [M + H]<sup>+</sup>.

2.2.15. Steps for the preparation of 6-(6-aminopyridin-3-yl)-N-ethyl-N-phenylquinazolin-4-amine (**7o**).

N-ethyl-6-iodo-N-phenylquinazolin-4-amine **5o** (1.5 mmol), 5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (1.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (4.6 mmol) were added to 15 mL of solvent [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1]. The mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-

6 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford yellow solid 6-(6-aminopyridin-3-yl)-N-ethyl-N-phenylquinazolin-4-amine **7o** (75.7 % yield), ESI-MS: m/z 342.1 [M + H]<sup>+</sup>.

### 2.3. General experimental protocol for the preparation of compounds **10a-10u**.

2.3.1. Procedure for the preparation of ethyl 6-(4-((4-methoxybenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10a**).

A mixture of 6-iodo-N-(4-methoxybenzyl)quinazolin-4-amine **7a** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((4-methoxybenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10a** as white solid (62.0 % yield).

2.3.2. Procedure for the preparation of ethyl 6-(4-((cyclopropylmethyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10b**).

6-(6-aminopyridin-3-yl)-N-(cyclopropylmethyl)quinazolin-4-amine **7b** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((cyclopropylmethyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10b** as white solid (49.8 % yield).

2.3.3. Procedure for the preparation of ethyl 6-(4-((4-fluorobenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10c**).

6-(6-aminopyridin-3-yl)-N-(4-fluorobenzyl)quinazolin-4-amine **7c** (0.5 mmol),

ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((4-fluorobenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10c** as white solid (55.1 % yield).

2.3.4. Procedure for the preparation of ethyl 6-(4-((4-(trifluoromethyl)benzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10d**).

6-(6-aminopyridin-3-yl)-N-(4-(trifluoromethyl)benzyl)quinazolin-4-amine **7d** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((4-(trifluoromethyl)benzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10d** as white solid (56.8 % yield).

2.3.5. Procedure for the preparation of ethyl 6-(4-((3-methylbenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10e**).

6-(6-aminopyridin-3-yl)-N-(3-methylbenzyl)quinazolin-4-amine **7e** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((3-methylbenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10e** as off-white solid (53.0 % yield).

2.3.6. Procedure for the preparation of ethyl 6-(4-((2-

(diethylamino)ethyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **(10f)**.

N<sup>1</sup>-(6-(6-aminopyridin-3-yl)quinazolin-4-yl)-N<sup>2</sup>,N<sup>2</sup>-diethylethane-1,2-diamine **7f** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((2-(diethylamino)ethyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10f** as brown solid (42.1 % yield).

2.3.7. Procedure for the preparation of ethyl 6-(4-((2-methylbenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **(10g)**.

6-(6-aminopyridin-3-yl)-N-(2-methylbenzyl)quinazolin-4-amine **7g** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((2-methylbenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10g** as pink solid (45.8 % yield).

2.3.8. Procedure for the preparation of ethyl 6-(4-((pyridin-2-ylmethyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **(10h)**.

6-(6-aminopyridin-3-yl)-N-(pyridin-2-ylmethyl)quinazolin-4-amine **7h** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((2-methylbenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10h** as

yellow solid (57.3 % yield).

2.3.9. Procedure for the preparation of ethyl 6-(4-((2-fluorobenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10i**).

6-(6-aminopyridin-3-yl)-N-(2-fluorobenzyl)quinazolin-4-amine **7i** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((2-fluorobenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10i** as off-white solid (59.2 % yield).

2.3.10. Procedure for the preparation of ethyl 6-(4-((3-fluorophenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10j**).

6-(6-aminopyridin-3-yl)-N-(3-fluorophenyl)quinazolin-4-amine **7j** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((3-fluorophenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10j** as yellow solid (46.7 % yield).

2.3.11. Procedure for the preparation of ethyl 6-(4-((3,5-dimethoxyphenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10k**).

6-(6-aminopyridin-3-yl)-N-(3,5-dimethoxyphenyl)quinazolin-4-amine **7k** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((3,5-

dimethoxyphenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10k** as yellow solid (50.2 % yield).

2.3.12. Procedure for the preparation of ethyl 6-(4-((2,3-difluorophenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10l**).

6-(6-aminopyridin-3-yl)-N-(2,3-difluorophenyl)quinazolin-4-amine **7m** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((2,3-difluorophenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10l** as white solid (55.3 % yield).

2.3.13. Procedure for the preparation of ethyl 6-(4-(ethyl(phenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10m**).

6-(6-aminopyridin-3-yl)-N-ethyl-N-phenylquinazolin-4-amine **7o** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-(ethyl(phenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10m** as pink flocculent (63.1 % yield).

2.3.14. Procedure for the preparation of ethyl 6-(4-((pyridin-3-ylmethyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10n**).

6-(6-aminopyridin-3-yl)-N-(pyridin-3-ylmethyl)quinazolin-4-amine **7l** (0.5 mmol), ethyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column

chromatography on silica with dichloromethane/methanol to obtain ethyl 6-(4-((pyridin-3-ylmethyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10n** as white solid (63.1 % yield).

2.3.15. Procedure for the preparation of methyl 6-(4-((4-methoxybenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10o**).

A mixture of 6-iodo-N-(4-methoxybenzyl)quinazolin-4-amine **7a** (0.5 mmol), methyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain methyl 6-(4-((4-methoxybenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10o** as white solid (43.7 % yield).

2.3.16. Procedure for the preparation of methyl 6-(4-((2-methylbenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10p**).

6-(6-aminopyridin-3-yl)-N-(2-methylbenzyl)quinazolin-4-amine **7g** (0.5 mmol), methyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain methyl 6-(4-((2-methylbenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10p** as off-white solid (36.7 % yield).

2.3.17. Procedure for the preparation of methyl 6-(4-((pyridin-2-ylmethyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10q**).

6-(6-aminopyridin-3-yl)-N-(pyridin-2-ylmethyl)quinazolin-4-amine **7h** (0.5 mmol), methyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents

were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain methyl 6-(4-((pyridin-2-ylmethyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10q** as yellow solid (53.8 % yield).

2.3.18. Procedure for the preparation of methyl 6-(4-((2-fluorobenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10r**).

6-(6-aminopyridin-3-yl)-N-(2-fluorobenzyl)quinazolin-4-amine **7i** (0.5 mmol), methyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain methyl 6-(4-((2-fluorobenzyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10r** as off-white solid (52.1 % yield).

2.3.19. Procedure for the preparation of methyl 6-(4-((3-fluorophenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10s**).

6-(6-aminopyridin-3-yl)-N-(3-fluorophenyl)quinazolin-4-amine **7j** (0.5 mmol), methyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain methyl 6-(4-((3-fluorophenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10s** as white solid (48.6 % yield).

2.3.20. Procedure for the preparation of methyl 6-(4-(methyl(p-tolyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10t**).

6-(6-aminopyridin-3-yl)-N-methyl-N-(p-tolyl)quinazolin-4-amine **7n** (0.5 mmol), methyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4

hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain methyl 6-(4-(methyl(p-tolyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10t** as pink flocculent (39.5 % yield).

2.3.21. Procedure for the preparation of methyl 6-(4-(ethyl(phenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate (**10u**).

6-(6-aminopyridin-3-yl)-N-ethyl-N-phenylquinazolin-4-amine **7o** (0.5 mmol), methyl bromopyruvate (1.5 mmol) and NaHCO<sub>3</sub> (1.5 mmol) was added to EtOH (5 mL) and the mixture was warmed to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvents were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to obtain methyl 6-(4-(ethyl(phenyl)amino)quinazolin-6-yl)imidazo[1,2-a]pyridine-2-carboxylate **10u** as orange flocculent (51.4 % yield).

### 3. Synthesis of compounds **13a-k**

3.1. General experimental protocol for the preparation of intermediates **12a-c**.

3.1.1. Procedure for the preparation of 2-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine (**12a**).

5-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (5.4 mmol), 2-bromoacetophenone (6.5 mmol) and NaHCO<sub>3</sub> (16 mmol) were added to EtOH (10 mL) and the mixture was heated to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and the mixture was extracted 2-3 times with ethyl acetate and saturated Na<sub>2</sub>CO<sub>3</sub> solution. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and rotary dried under vacuum to form 2-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12a** as pale yellow oil

substance (86.8 % yield), ESI-MS:  $m/z$  321.1  $[M + H]^+$ .

3.1.2. Procedure for the preparation of 2-(4-fluorophenyl)-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine (**12b**).

5-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (5.4 mmol), 2-bromo-4'-fluoroacetophenone (6.5 mmol) and  $\text{NaHCO}_3$  (16 mmol) were added to EtOH (10 mL) and the mixture was heated to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and the mixture was extracted 2-3 times with ethyl acetate and saturated  $\text{Na}_2\text{CO}_3$  solution. The organic phase was dried over anhydrous  $\text{Na}_2\text{SO}_4$  and rotary dried under vacuum to form 2-(4-fluorophenyl)-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12b** as yellow solid (81.5 % yield), ESI-MS:  $m/z$  337.2  $[M + H]^+$ .

3.1.3. Procedure for the preparation of 2-cyclopropyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine (**12c**).

5-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)pyridin-2-amine (5.4 mmol), 2-bromo-1-cyclopropylethanone (6.5 mmol) and  $\text{NaHCO}_3$  (16 mmol) were added to EtOH (10 mL) and the mixture was heated to 80 °C and refluxed by condensation under argon for 4 hours. After completion of the reaction (monitored by TLC), the solvent of the reaction mixture was removed under reduced pressure and the mixture was extracted 2-3 times with ethyl acetate and saturated  $\text{Na}_2\text{CO}_3$  solution. The organic phase was dried over anhydrous  $\text{Na}_2\text{SO}_4$  and rotary dried under vacuum to form 2-cyclopropyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12c** as yellow solid (81.5 % yield), ESI-MS:  $m/z$  283.2  $[M + H]^+$ .

3.2. General experimental protocol for preparation of compounds **13a-13k**

3.2.1. Procedure for the preparation of N-(2-fluorobenzyl)-6-(2-phenylimidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine (**13a**).

N-(2-fluorobenzyl)-6-iodoquinazolin-4-amine **5i** (0.5mmol), 2-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12a** (0.5 mmol) and  $\text{K}_2\text{CO}_3$  (1.5 mmol) were added to 1,4-dioxane/water 10 mL [ $V_{(1,4\text{-dioxane})}:V_{(\text{water})} = 4:1$ ] and the mixture was heated to 100 °C under a protective atmosphere of argon followed

by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford N-(2-fluorobenzyl)-6-(2-phenylimidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine **13a** as pink flocculent (67.3 % yield).

3.2.2. Procedure for the preparation of N-(2-fluorobenzyl)-6-(2-(4-fluorophenyl)imidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine (**13b**).

N-(2-fluorobenzyl)-6-iodoquinazolin-4-amine **5i** (0.5mmol), 2-(4-fluorophenyl)-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12b** (0.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (1.5 mmol) were added to 1,4-dioxane/water 10 mL [ $V_{(1,4\text{-dioxane})}:V_{(\text{water})} = 4:1$ ] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford N-(2-fluorobenzyl)-6-(2-(4-fluorophenyl)imidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine **13b** as pink flocculent (70.7 % yield).

3.2.3. Procedure for the preparation of N-(2,3-difluorophenyl)-6-(2-phenylimidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine (**13c**).

N-(2,3-difluorophenyl)-6-iodoquinazolin-4-amine **5m** (0.5mmol), 2-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12a** (0.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (1.5 mmol) were added to 1,4-dioxane/water 10 mL [ $V_{(1,4\text{-dioxane})}:V_{(\text{water})} = 4:1$ ] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford N-(2,3-difluorophenyl)-6-(2-phenylimidazo[1,2-a]pyridin-6-yl)quinazolin-4-

amine **13c** as pink flocculent (73.2 % yield).

3.2.4. Procedure for the preparation of N-(2,3-difluorophenyl)-6-(2-(4-fluorophenyl)imidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine (**13d**).

N-(2,3-difluorophenyl)-6-iodoquinazolin-4-amine **5m** (0.5mmol), 2-(4-fluorophenyl)-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12b** (0.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (1.5 mmol) were added to 1,4-dioxane/water 10 mL [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford N-(2,3-difluorophenyl)-6-(2-(4-fluorophenyl)imidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine **13d** as pink flocculent (72.5 % yield).

3.2.5. Procedure for the preparation of N-(cyclopropylmethyl)-6-(2-(4-fluorophenyl)imidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine (**13e**).

N-(cyclopropylmethyl)-6-iodoquinazolin-4-amine **5b** (0.5mmol), 2-(4-fluorophenyl)-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12b** (0.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (1.5 mmol) were added to 1,4-dioxane/water 10 mL [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford N-(cyclopropylmethyl)-6-(2-(4-fluorophenyl)imidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine **13e** as pink flocculent (56.1 % yield).

3.2.6. Procedure for the preparation of 6-(2-phenylimidazo[1,2-a]pyridin-6-yl)-N-(1H-pyrazol-3-yl)quinazolin-4-amine (**13f**).

6-iodo-N-(1H-pyrazol-3-yl)quinazolin-4-amine **5p** (0.5mmol), 2-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12a** (0.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (1.5 mmol) were added to 1,4-dioxane/water 10 mL [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford 6-(2-phenylimidazo[1,2-a]pyridin-6-yl)-N-(1H-pyrazol-3-yl)quinazolin-4-amine **13f** as pink solid (54.6 % yield).

3.2.7. Procedure for the preparation of 6-(2-cyclopropylimidazo[1,2-a]pyridin-6-yl)-N-(cyclopropylmethyl)quinazolin-4-amine (**13g**).

N-(cyclopropylmethyl)-6-iodoquinazolin-4-amine **5b** (0.5mmol), 2-cyclopropyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12c** (0.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (1.5 mmol) were added to 1,4-dioxane/water 10 mL [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford 6-(2-cyclopropylimidazo[1,2-a]pyridin-6-yl)-N-(cyclopropylmethyl)quinazolin-4-amine **13g** as yellow solid (60.6 % yield).

3.2.8. Procedure for the preparation of 6-(2-cyclopropylimidazo[1,2-a]pyridin-6-yl)-N-ethyl-N-phenylquinazolin-4-amine (**13h**).

N-ethyl-6-iodo-N-phenylquinazolin-4-amine **5o** (0.5mmol), 2-cyclopropyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12c** (0.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (1.5 mmol) were added to 1,4-dioxane/water 10 mL [V<sub>(1,4-dioxane)</sub>:V<sub>(water)</sub> = 4:1] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these

conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford 6-(2-cyclopropylimidazo[1,2-a]pyridin-6-yl)-N-ethyl-N-phenylquinazolin-4-amine **13h** as yellow solid (58.3 % yield).

3.2.9. Procedure for the preparation of N-ethyl-N-phenyl-6-(2-phenylimidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine (**13i**).

N-ethyl-6-iodo-N-phenylquinazolin-4-amine **5o** (0.5mmol), 2-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12a** (0.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (1.5 mmol) were added to 1,4-dioxane/water 10 mL [ $V_{(1,4\text{-dioxane})}:V_{(\text{water})} = 4:1$ ] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford N-ethyl-N-phenyl-6-(2-phenylimidazo[1,2-a]pyridin-6-yl)quinazolin-4-amine **13i** as pink solid (67.4 % yield).

3.2.10. Procedure for the preparation of 6-(2-phenylimidazo[1,2-a]pyridin-6-yl)-N-(pyridin-2-ylmethyl)quinazolin-4-amine (**13j**).

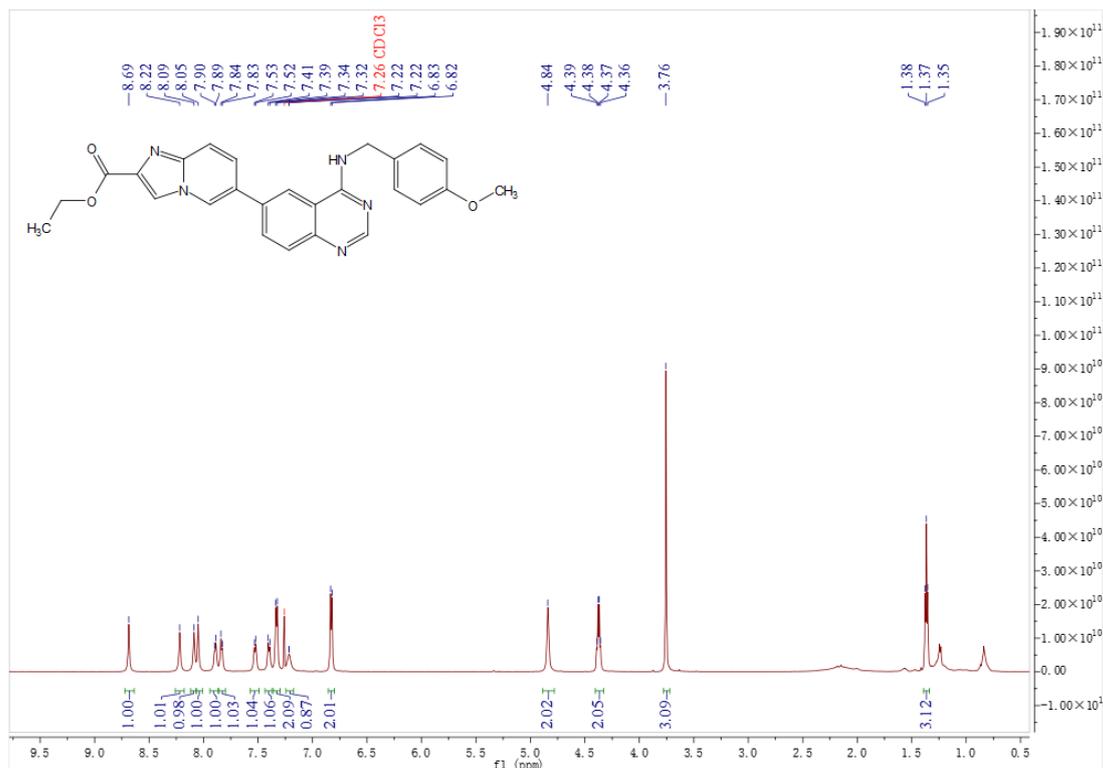
6-iodo-N-(pyridin-2-ylmethyl)quinazolin-4-amine **5h** (0.5mmol), 2-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12a** (0.5 mmol) and K<sub>2</sub>CO<sub>3</sub> (1.5 mmol) were added to 1,4-dioxane/water 10 mL [ $V_{(1,4\text{-dioxane})}:V_{(\text{water})} = 4:1$ ] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of Pd(dppf)Cl<sub>2</sub>. The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford 6-(2-phenylimidazo[1,2-a]pyridin-6-yl)-N-(pyridin-2-ylmethyl)quinazolin-4-amine **13j** as pink solid (70.2 % yield).

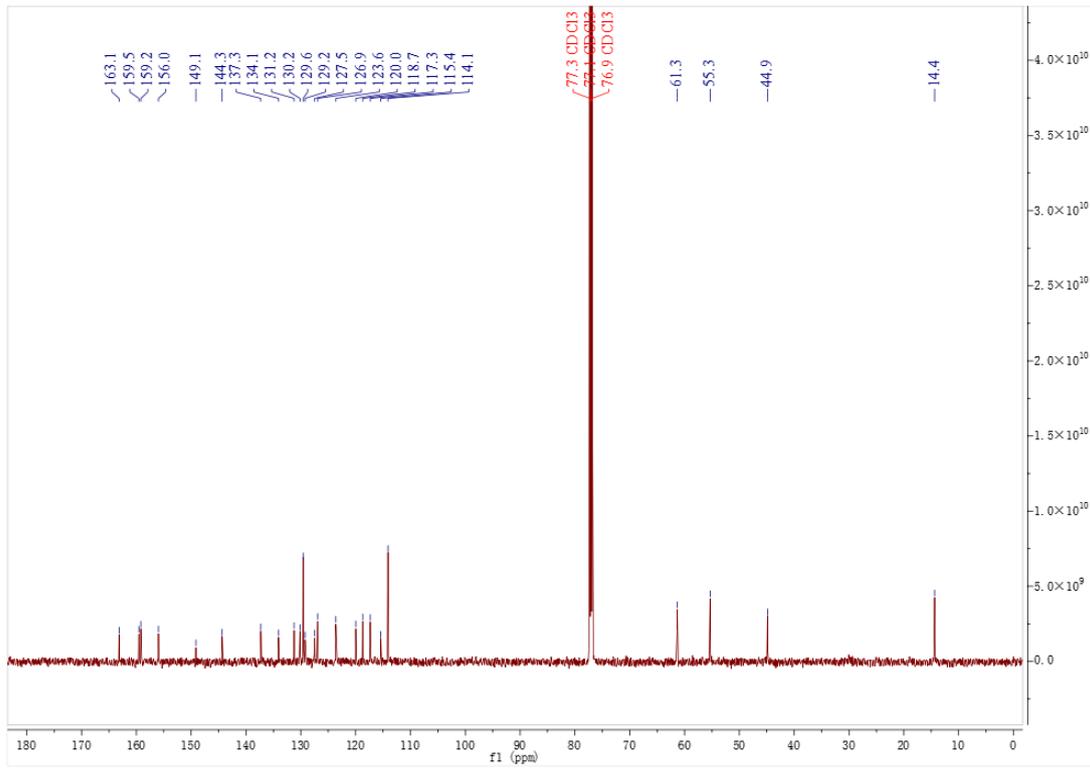
3.2.11. Procedure for the preparation of 6-(2-phenylimidazo[1,2-a]pyridin-6-yl)-N-((tetrahydro-2H-pyran-4-yl)methyl)quinazolin-4-amine (**13k**).

6-iodo-N-((tetrahydro-2H-pyran-4-yl)methyl)quinazolin-4-amine **5q** (0.5mmol), 2-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)imidazo[1,2-a]pyridine **12a** (0.5 mmol) and  $K_2CO_3$  (1.5 mmol) were added to 1,4-dioxane/water 10 mL [ $V_{(1,4\text{-dioxane})}:V_{(\text{water})} = 4:1$ ] and the mixture was heated to 100 °C under a protective atmosphere of argon followed by the addition of  $Pd(dppf)Cl_2$ . The mixture continues to be stirred under these conditions for a further 4-5 hours. After completion of the reaction (monitored by TLC), the 1, 4-dioxane and water were removed under reduced pressure and the residue was purified through a column chromatography on silica with dichloromethane/methanol to afford 6-(2-phenylimidazo[1,2-a]pyridin-6-yl)-N-((tetrahydro-2H-pyran-4-yl)methyl)quinazolin-4-amine **13k** as pink solid (69.8 % yield).

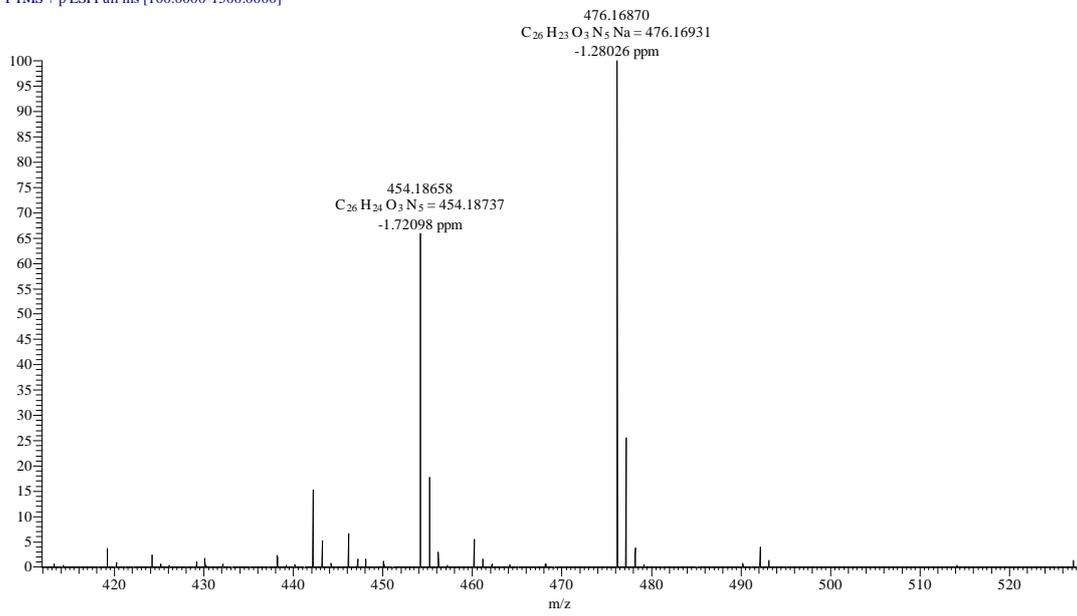
#### 4. $^1H$ NMR and $^{13}C$ NMR Spectrum of the compounds 10a-10u.

Spectra of compound **10a** ( $^1H$  NMR,  $^{13}C$  NMR, HRMS)

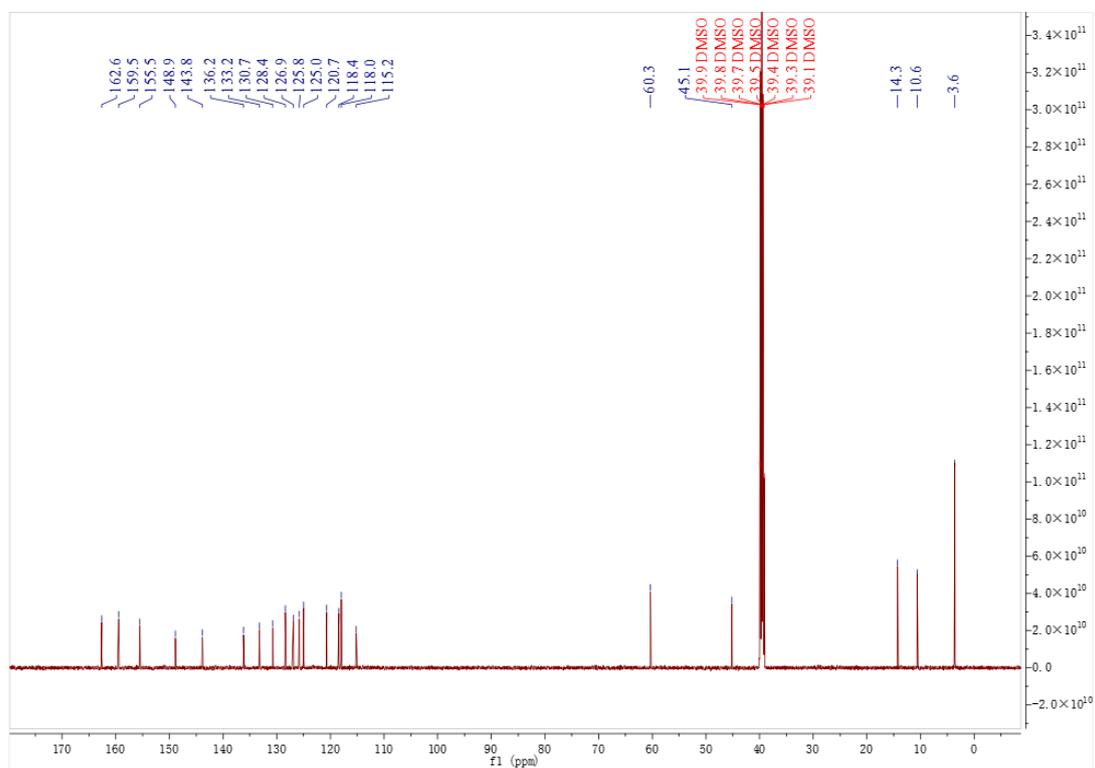
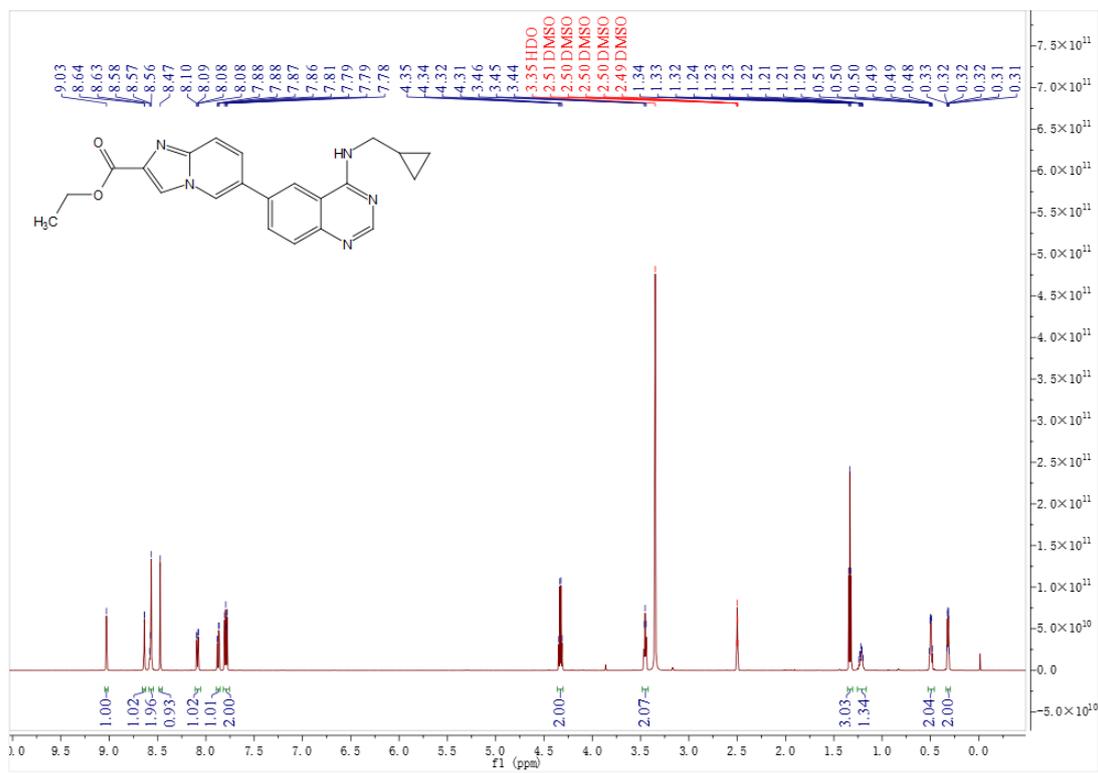




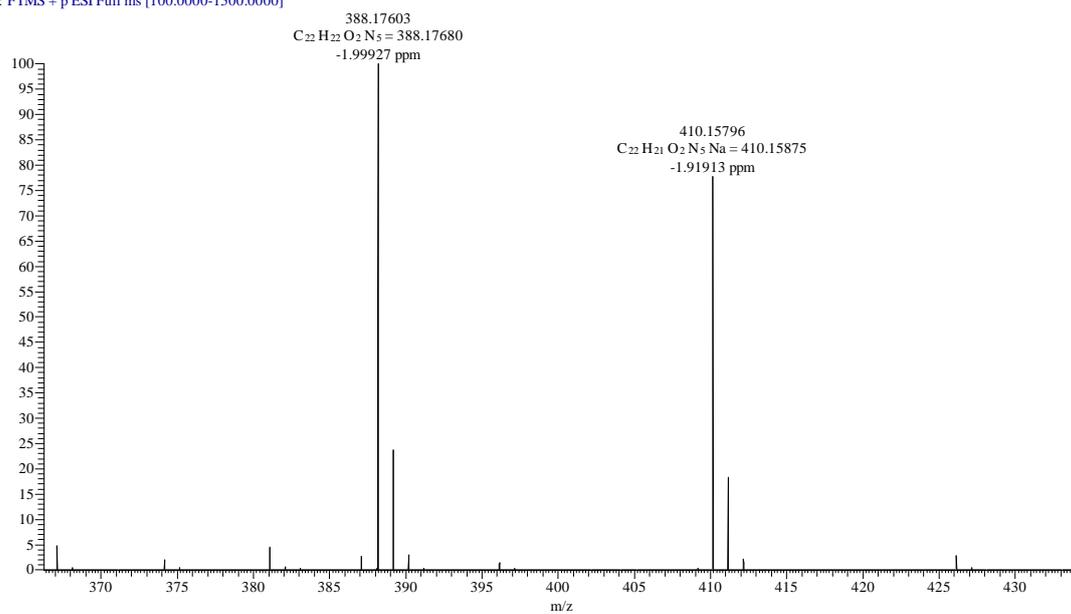
L3-17 #24 RT: 0.11 AV: 1 NL: 1.00E9  
 T: FTMS + p ESI Full ms [100.0000-1500.0000]



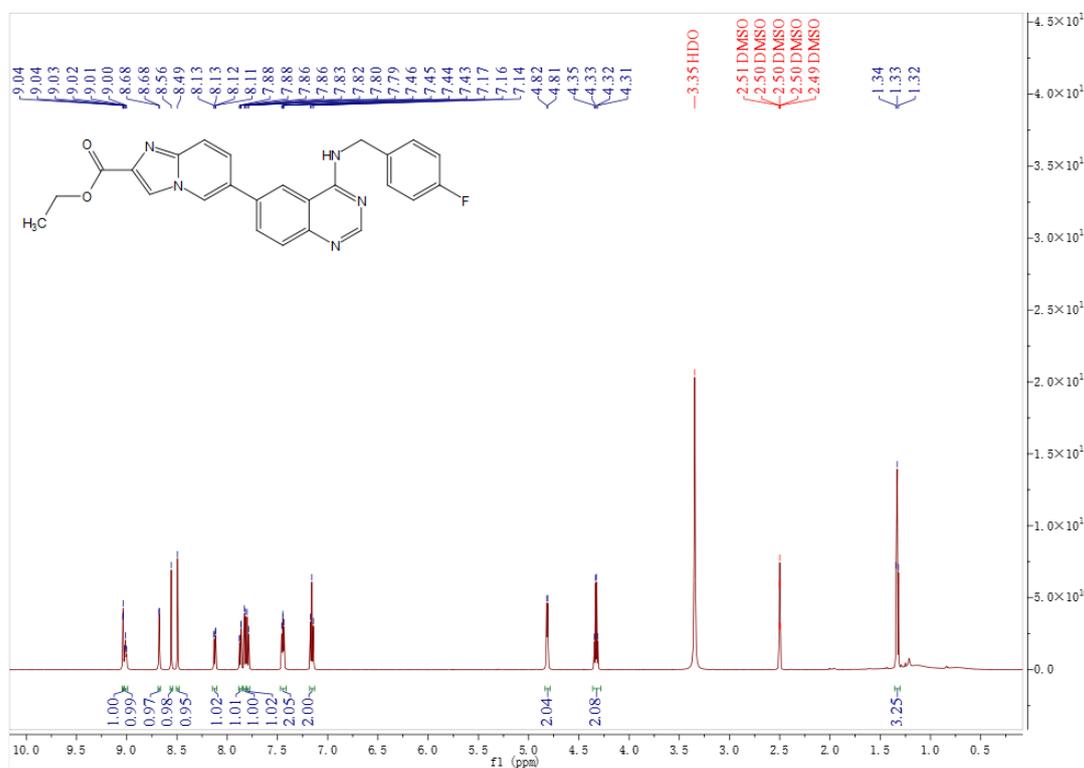
Spectra of compound **10b** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)

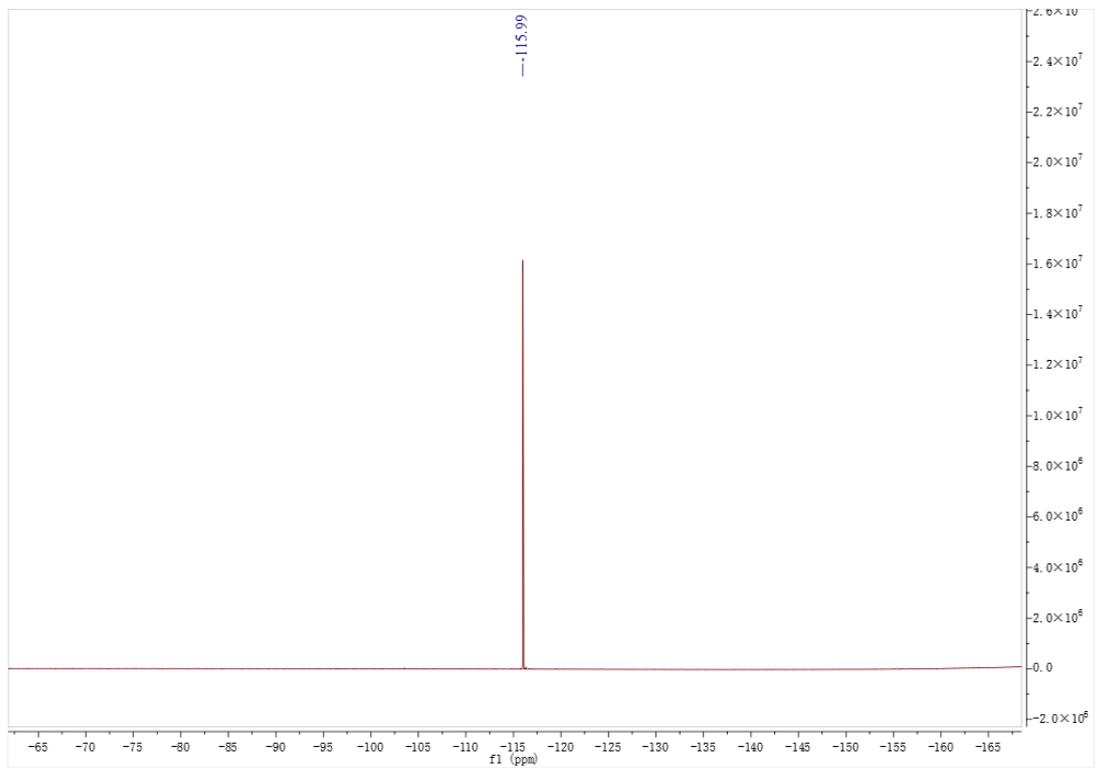
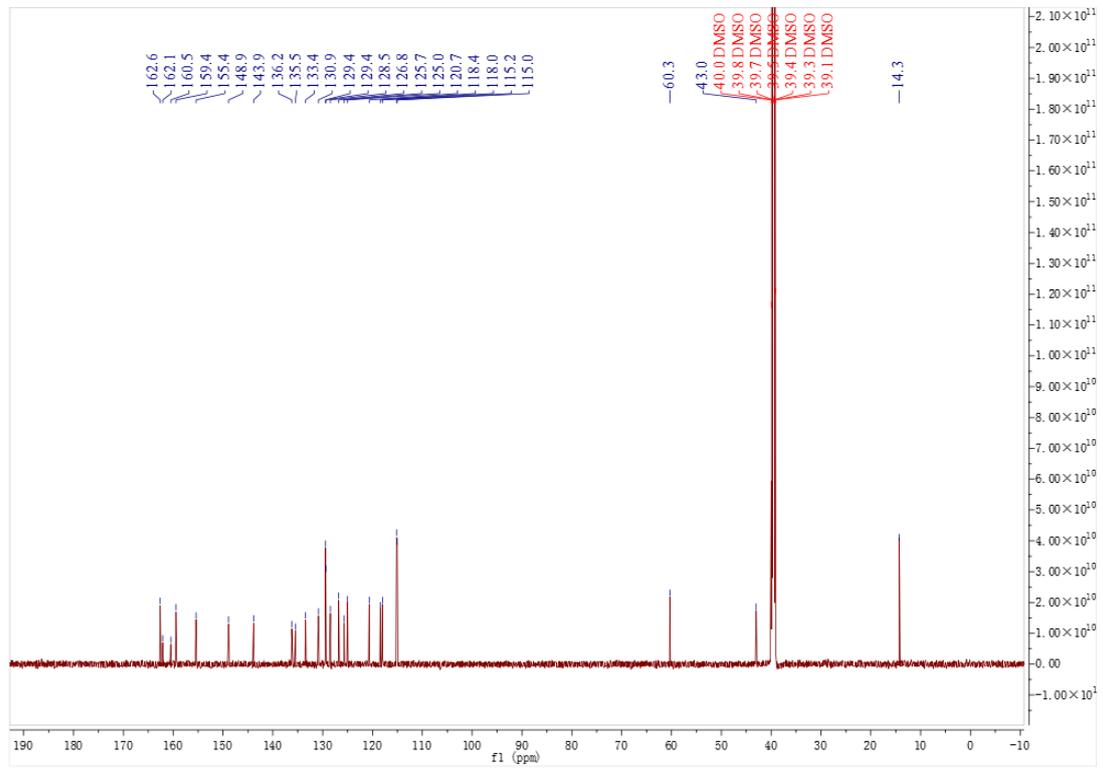


L3-6 #35 RT: 0.15 AV: 1 NL: 5.82E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

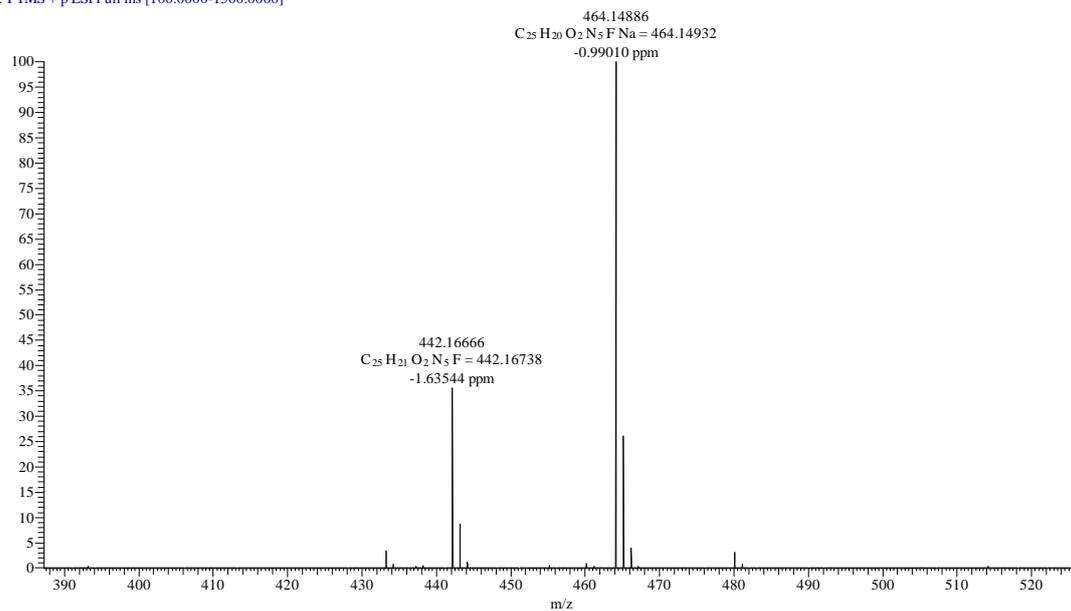


### Spectra of compound 10c (<sup>1</sup>H NMR, <sup>13</sup>C NMR, <sup>19</sup>F NMR, HRMS)

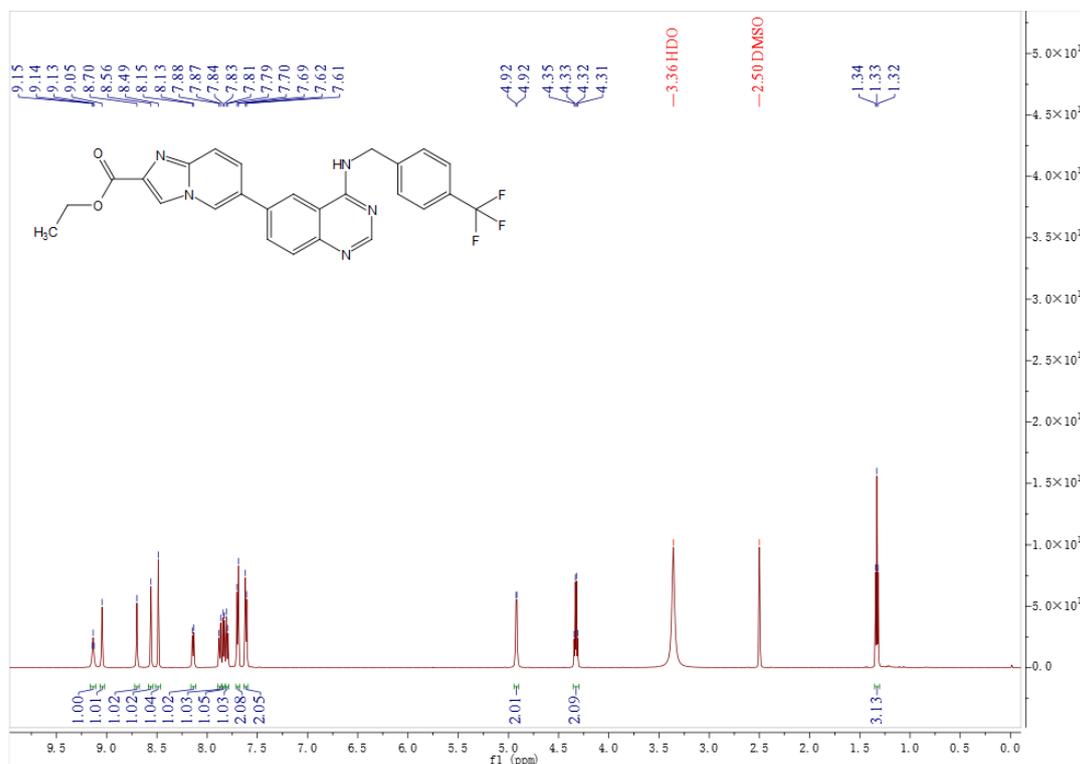


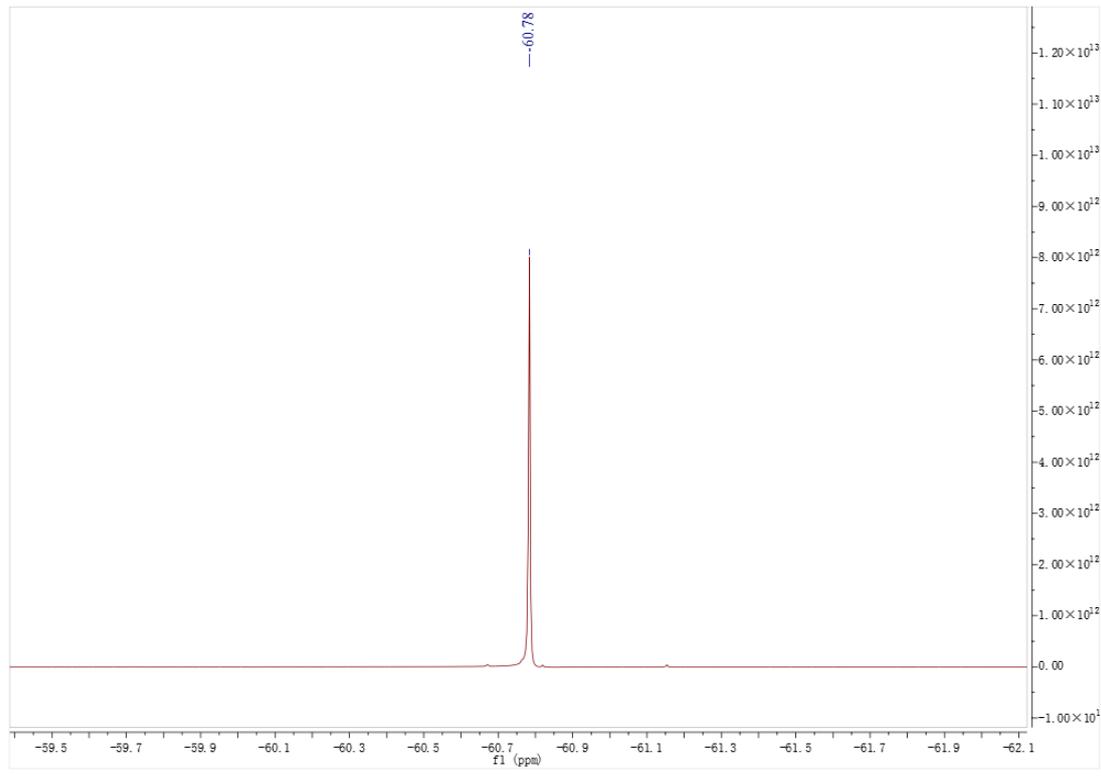
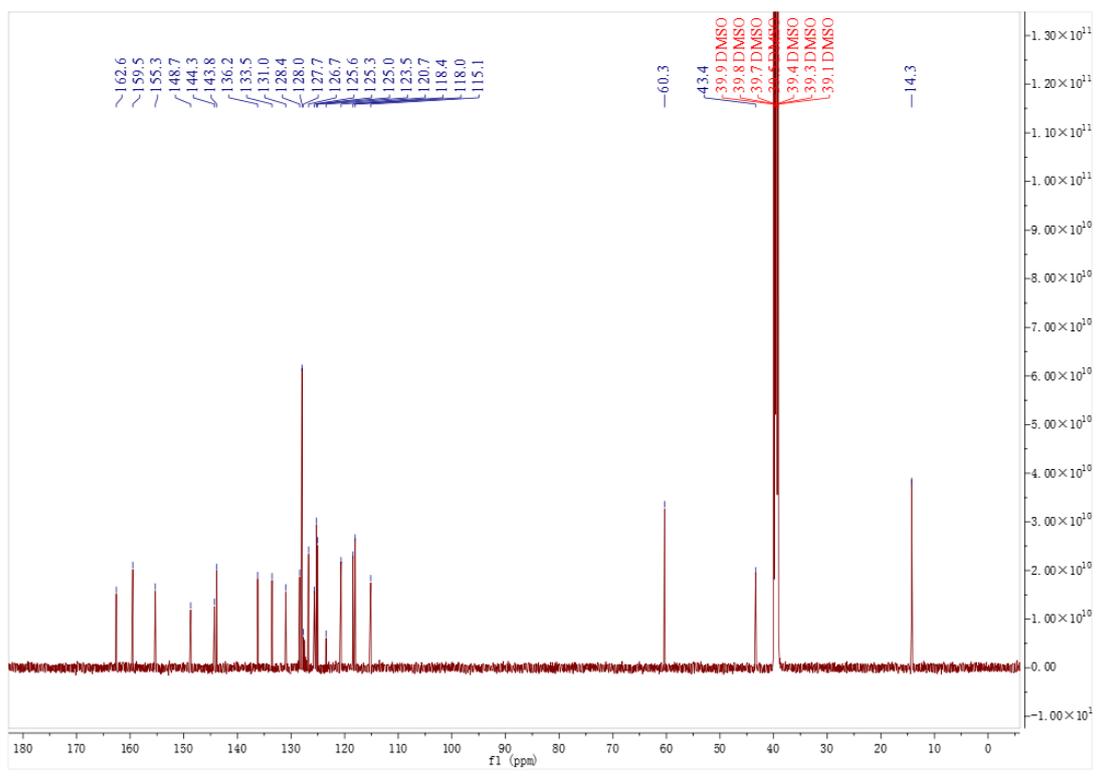


L3-11 #24 RT: 0.10 AV: 1 NL: 1.20E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

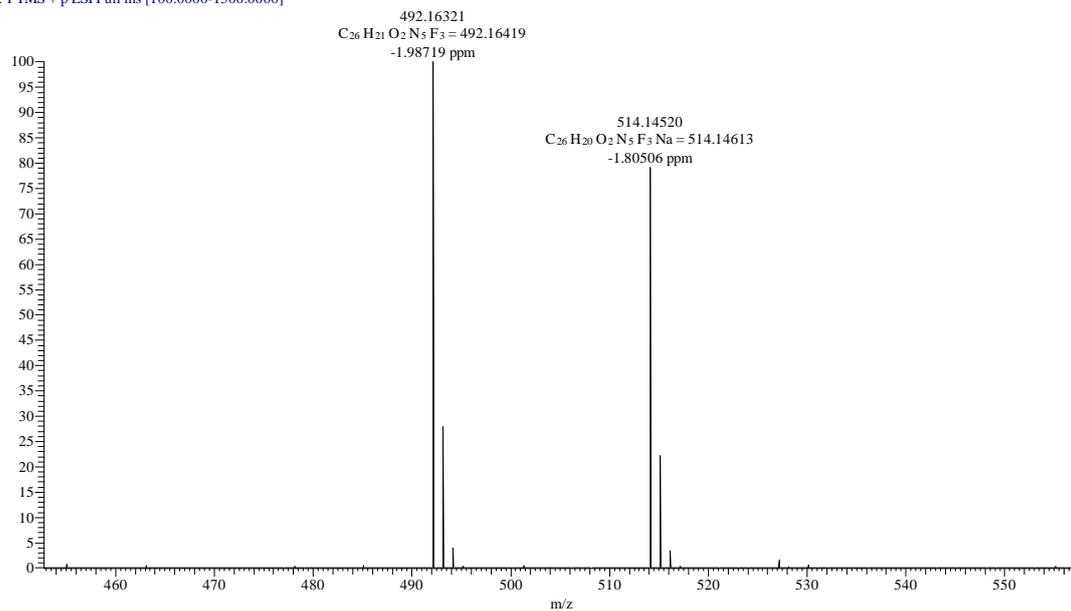


### Spectra of compound **10d** ( $^1H$ NMR, $^{13}C$ NMR, $^{19}F$ NMR, HRMS)

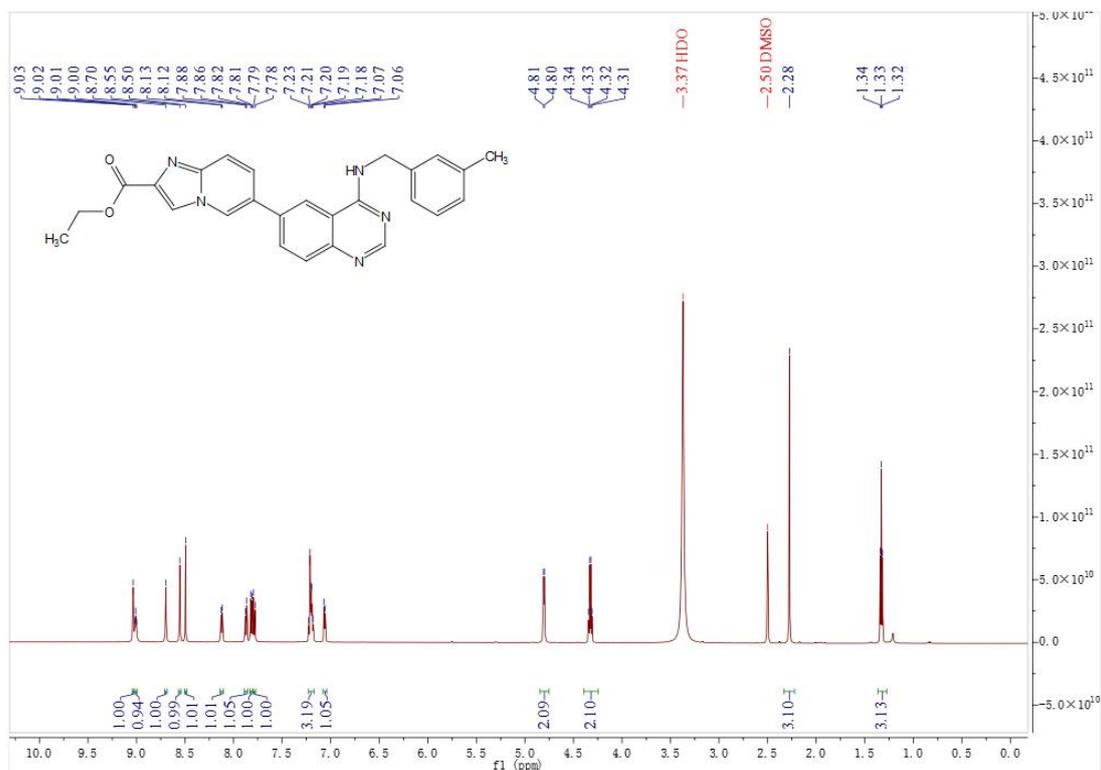


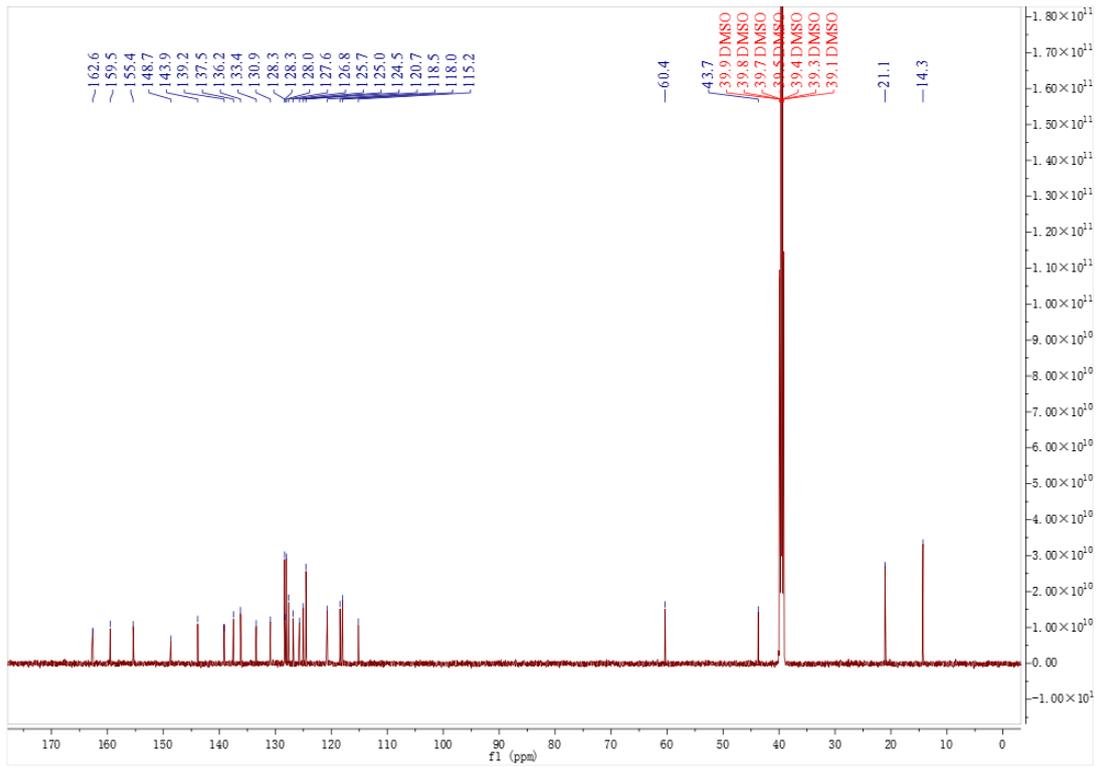


L3-12 #38 RT: 0.17 AV: 1 NL: 3.46E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

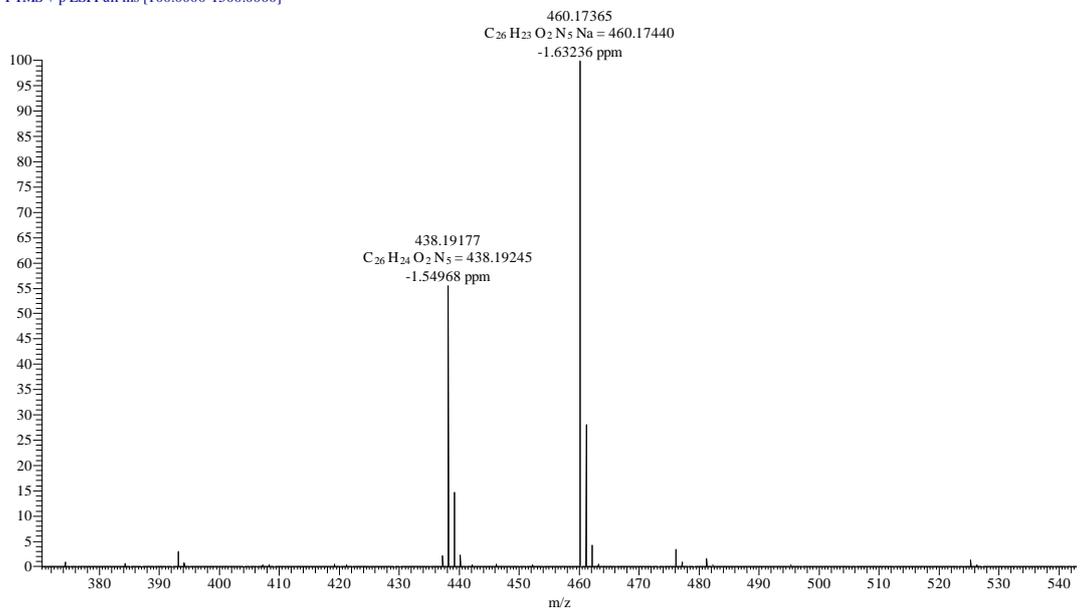


### Spectra of compound 10e (<sup>1</sup>H NMR, <sup>13</sup>C NMR, HRMS)

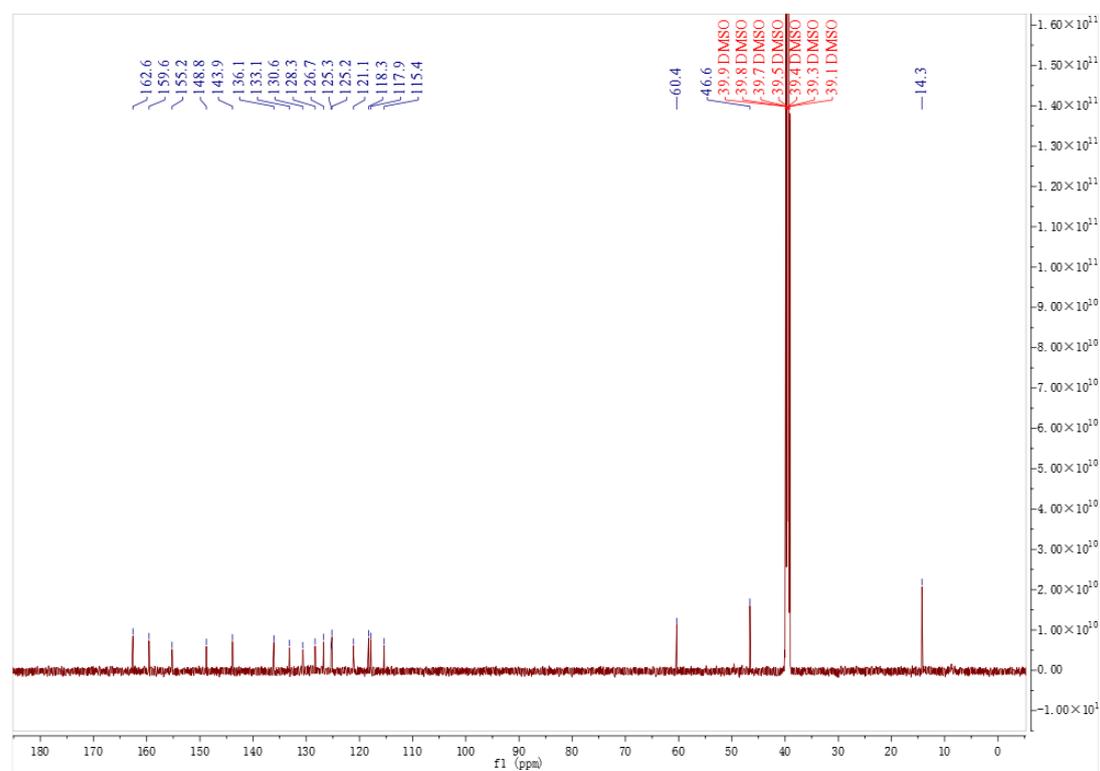
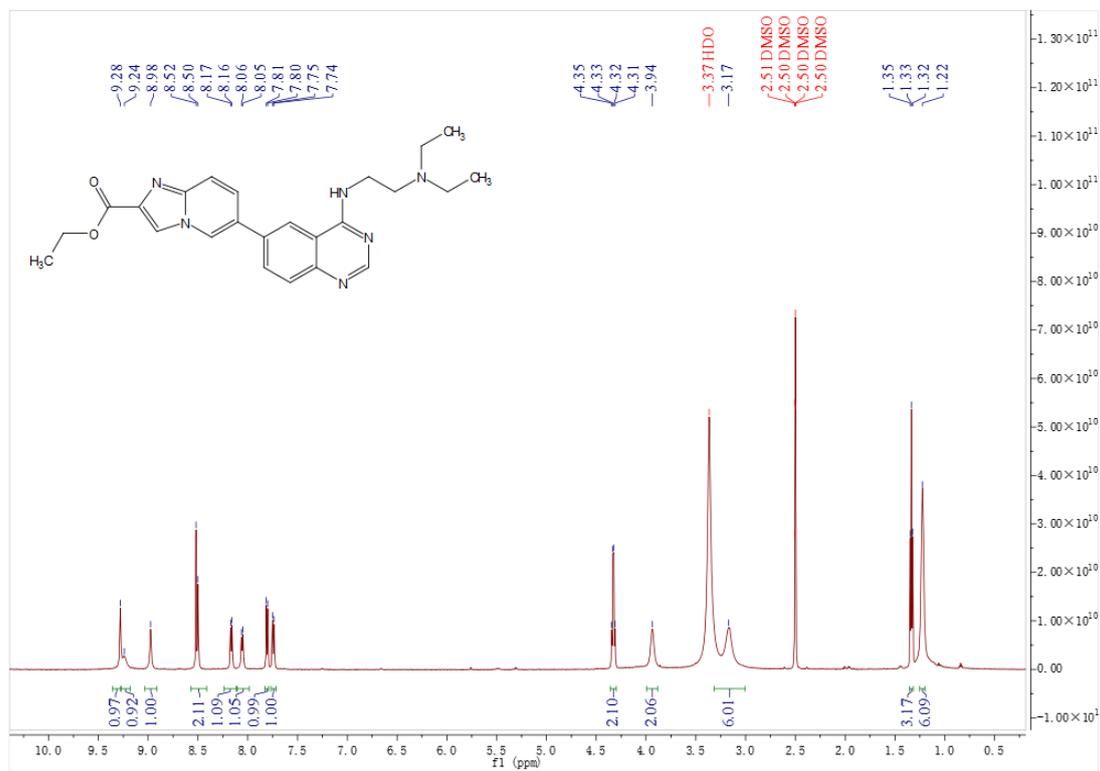




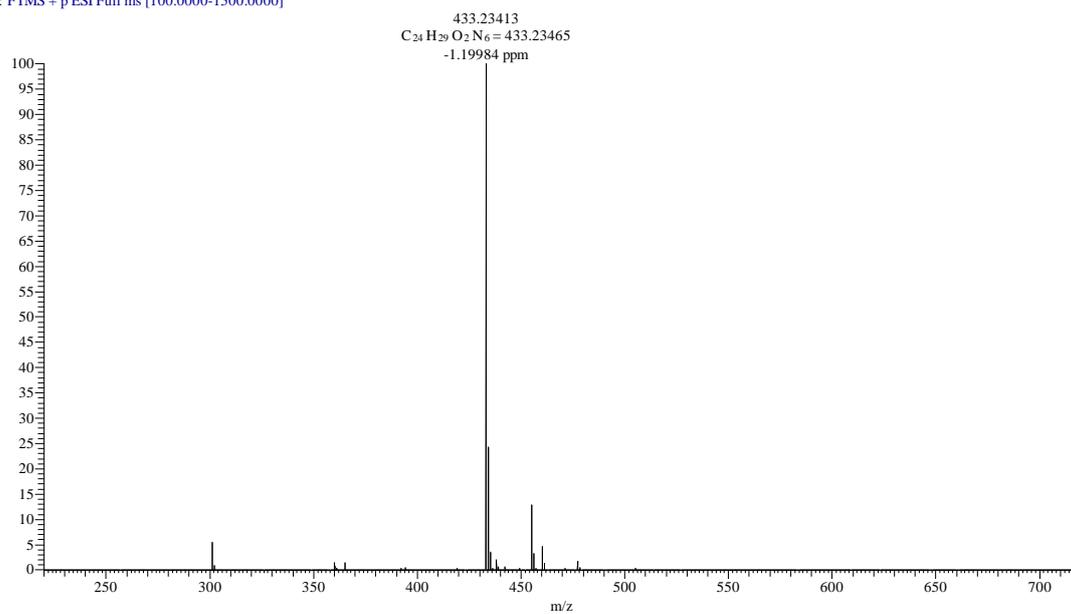
L3-5 #25 RT: 0.11 AV: 1 NL: 1.70E9  
 T: FTMS + p ESI Full ms [100.0000-1500.0000]



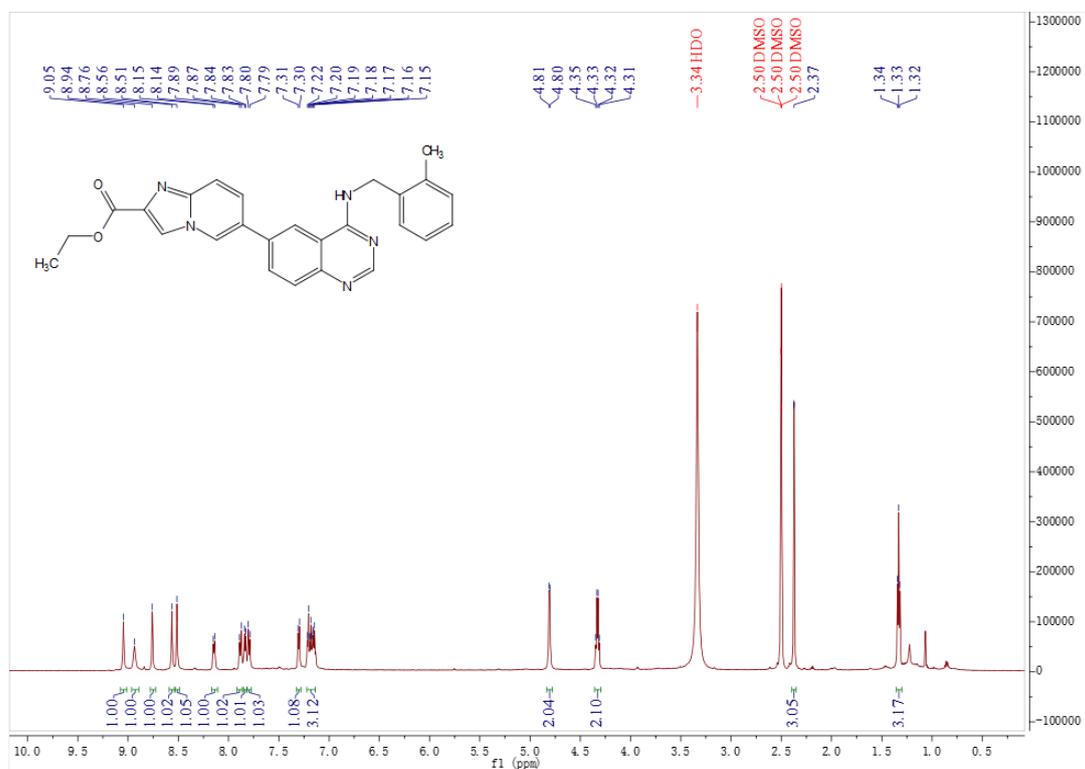
Spectra of compound **10f** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)

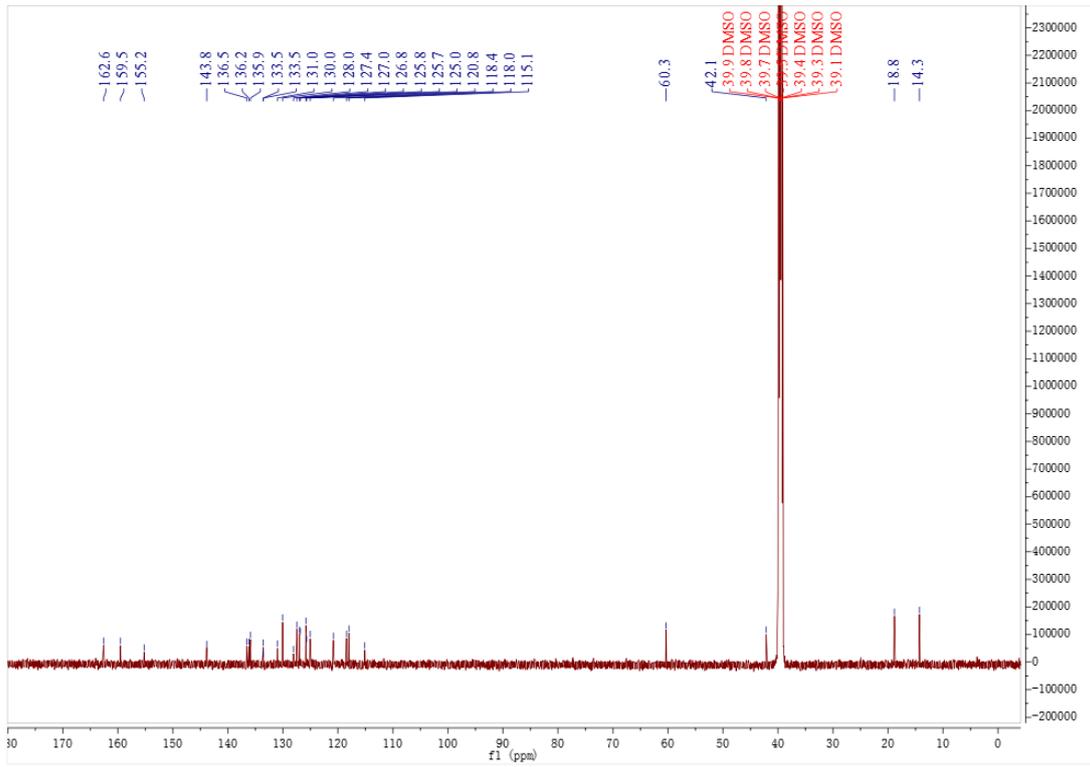


L3-18 #22 RT: 0.10 AV: 1 NL: 3.94E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

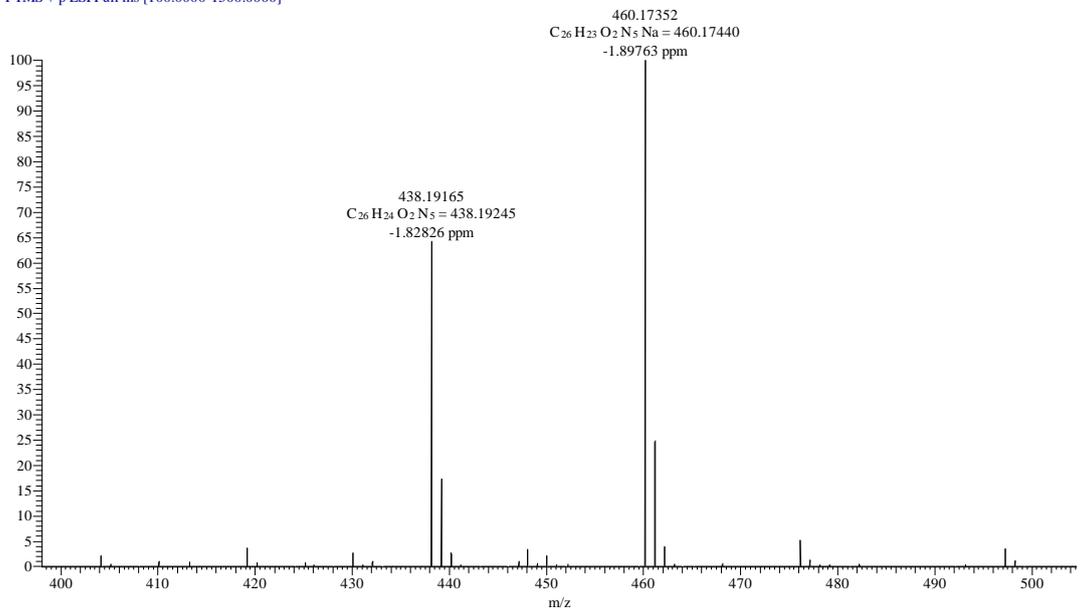


### Spectra of compound **10g** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, HRMS)

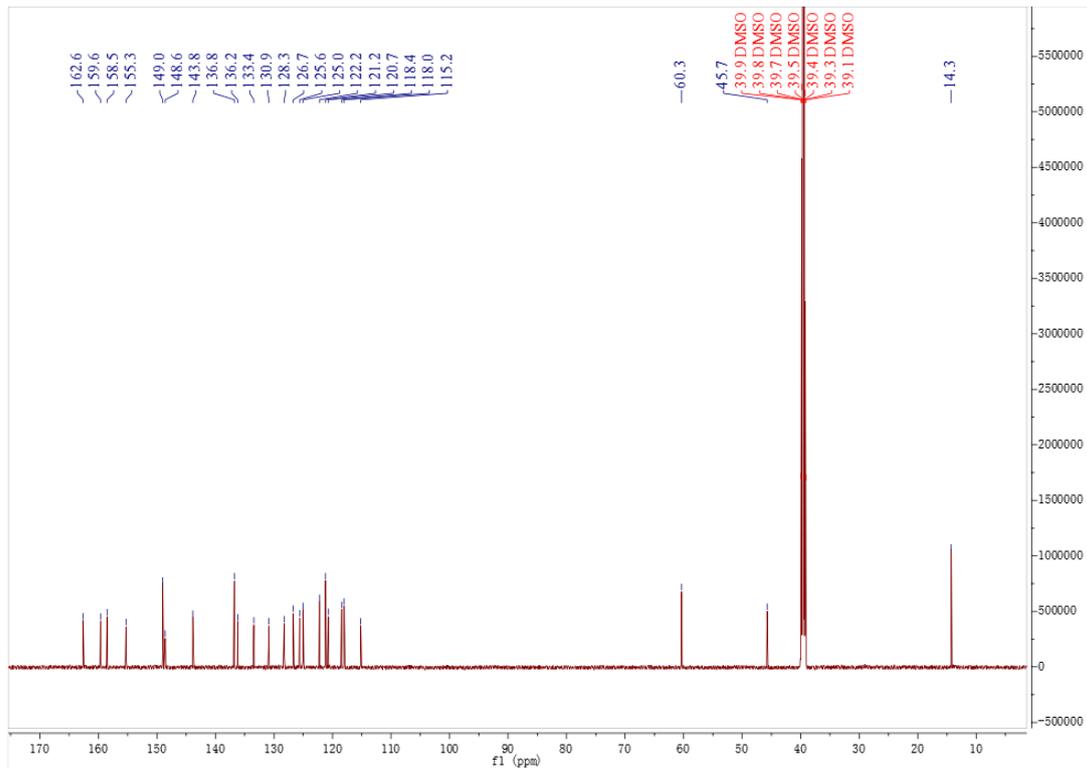
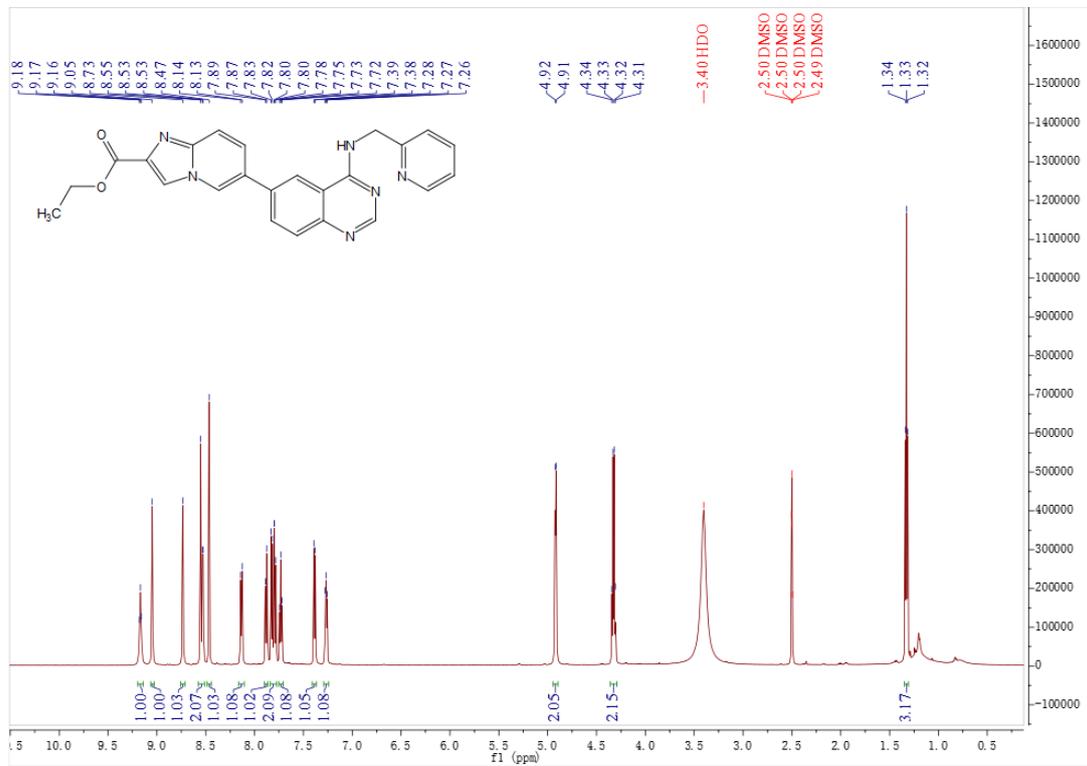




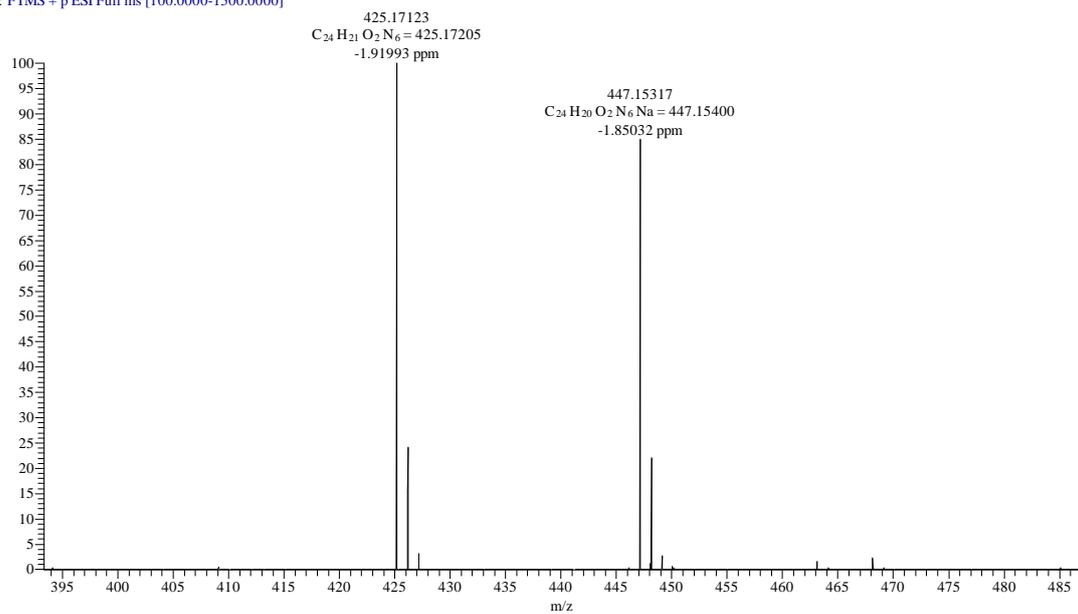
L3-25 #26 RT: 0.11 AV: 1 NL: 1.12E9  
 T: FTMS + p ESI Full ms [100.0000-1500.0000]



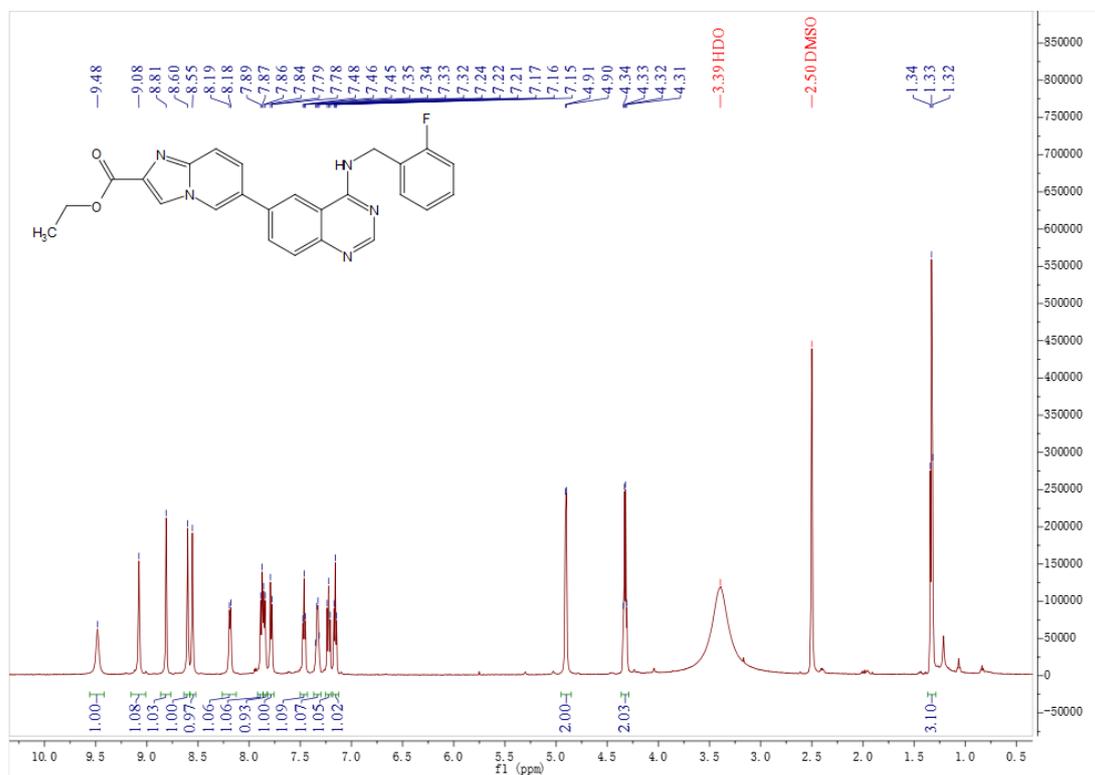
Spectra of compound **10h** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)

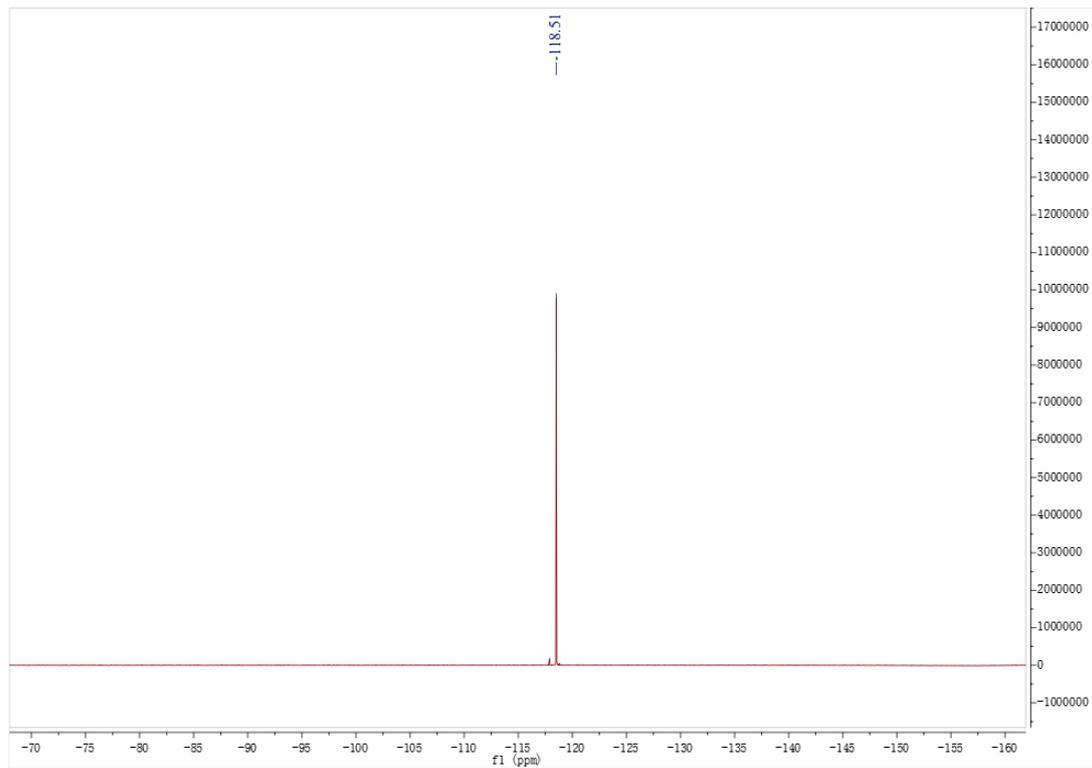
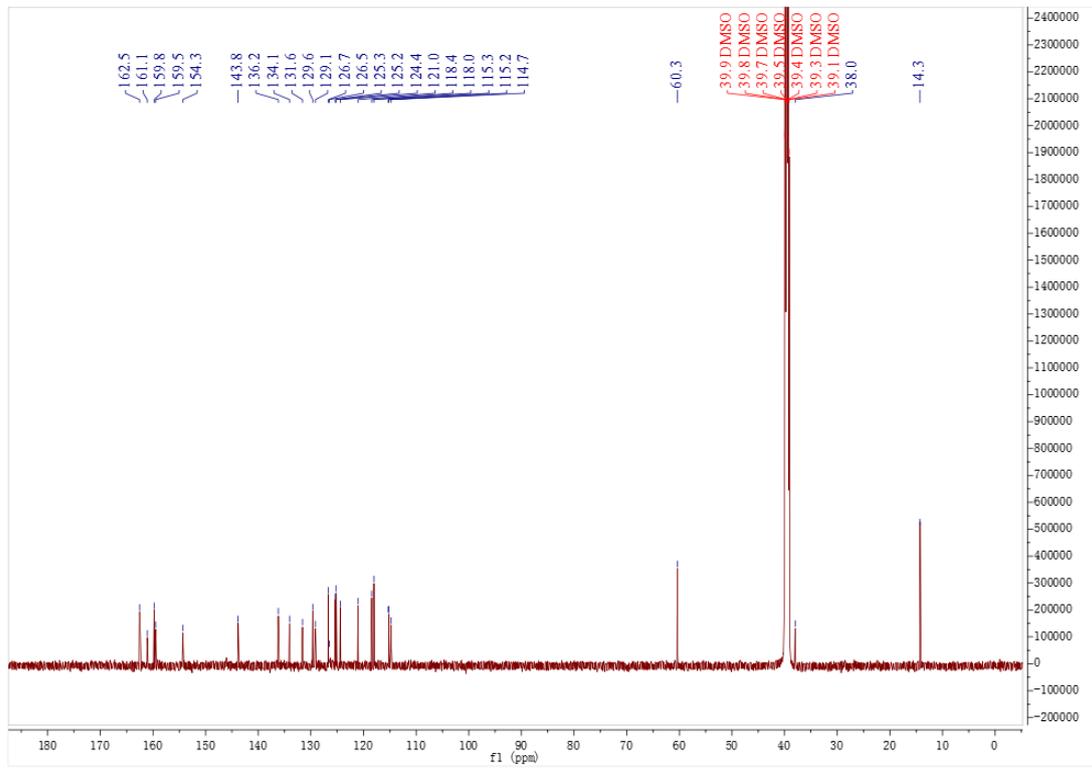


L3-26 #43 RT: 0.19 AV: 1 NL: 5.03E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

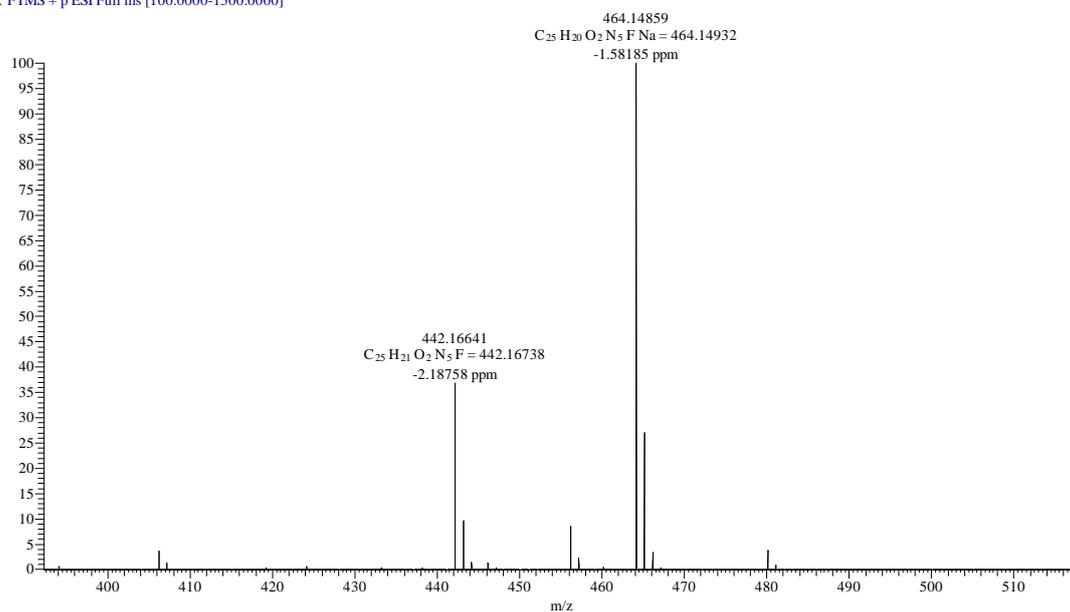


Spectra of compound **10i** ( $^1H$  NMR,  $^{13}C$  NMR,  $^{19}F$  NMR, HRMS)

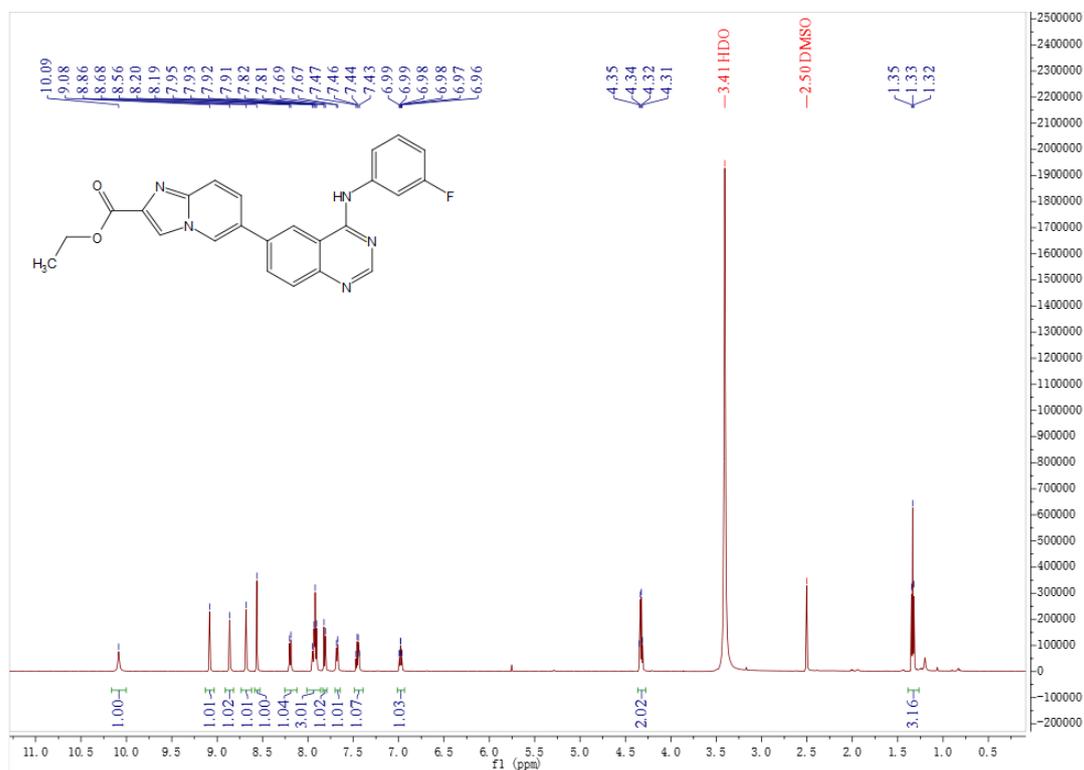


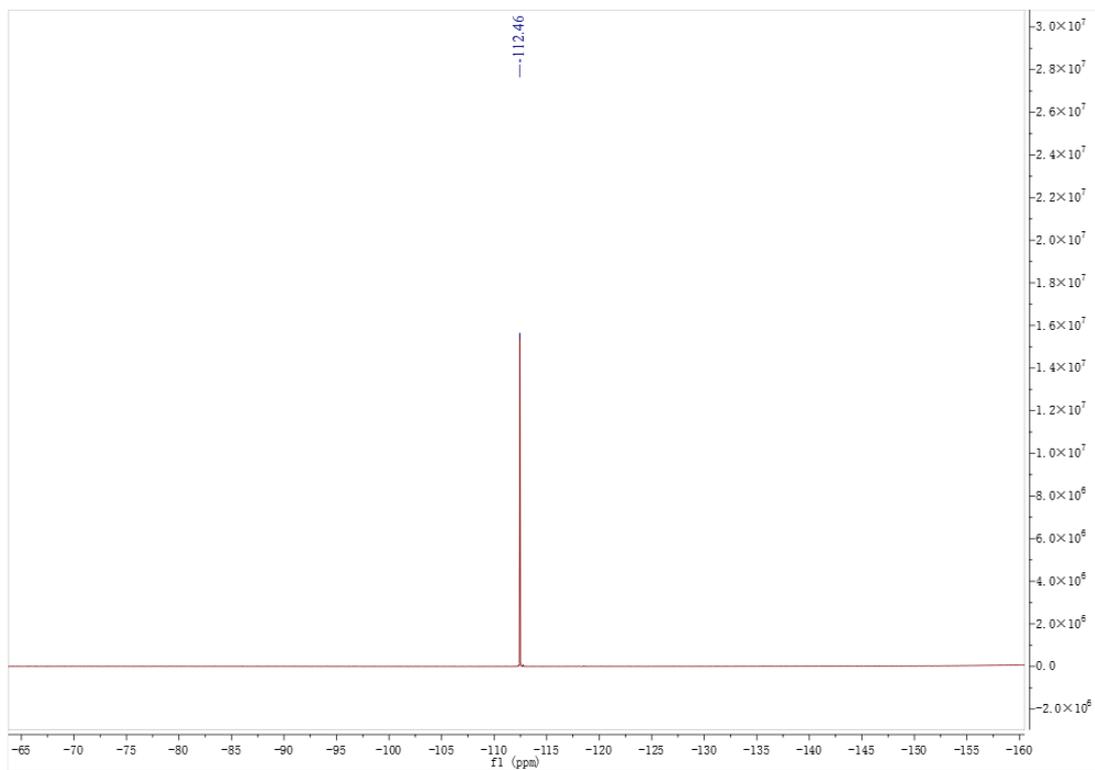
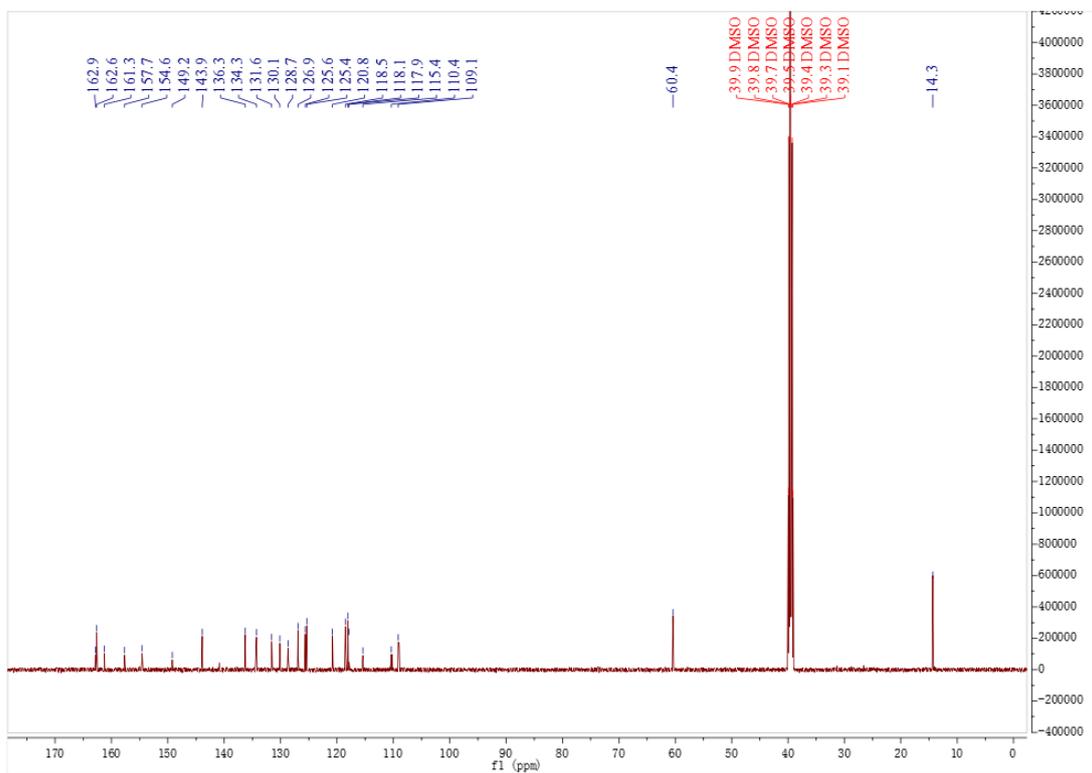


L3-35 #29 RT: 0.13 AV: 1 NL: 1.34E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

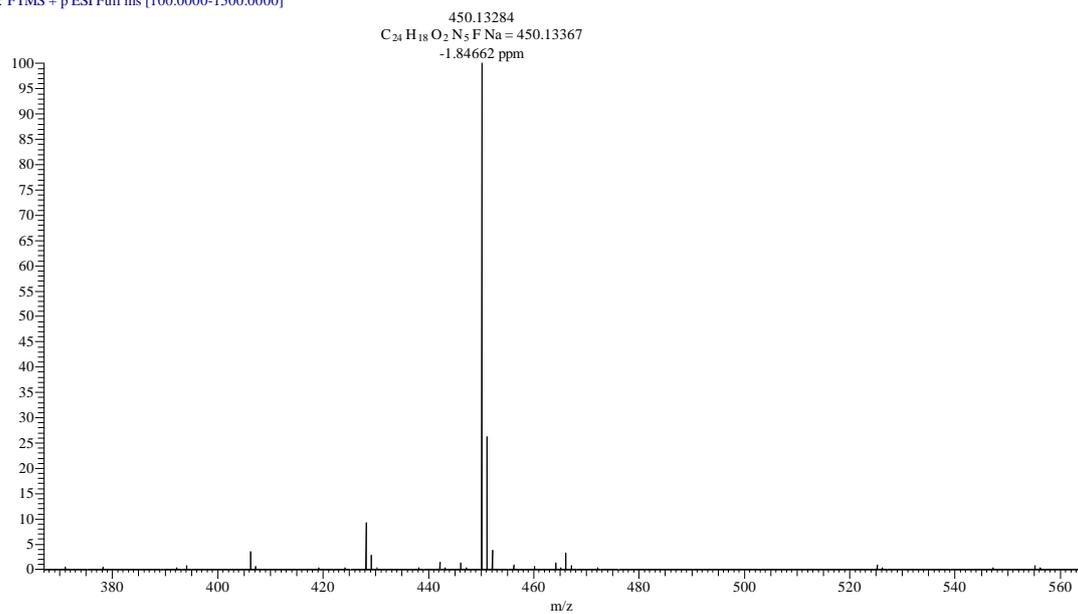


### Spectra of compound **10j** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, <sup>19</sup>F NMR, HRMS)

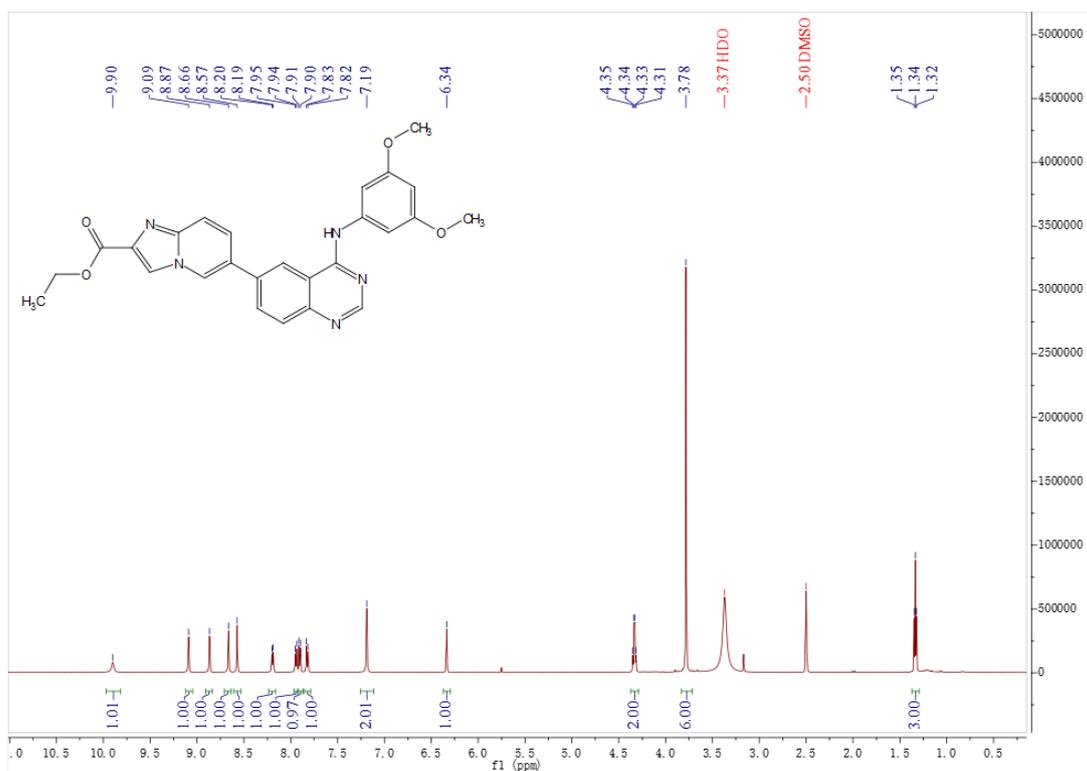


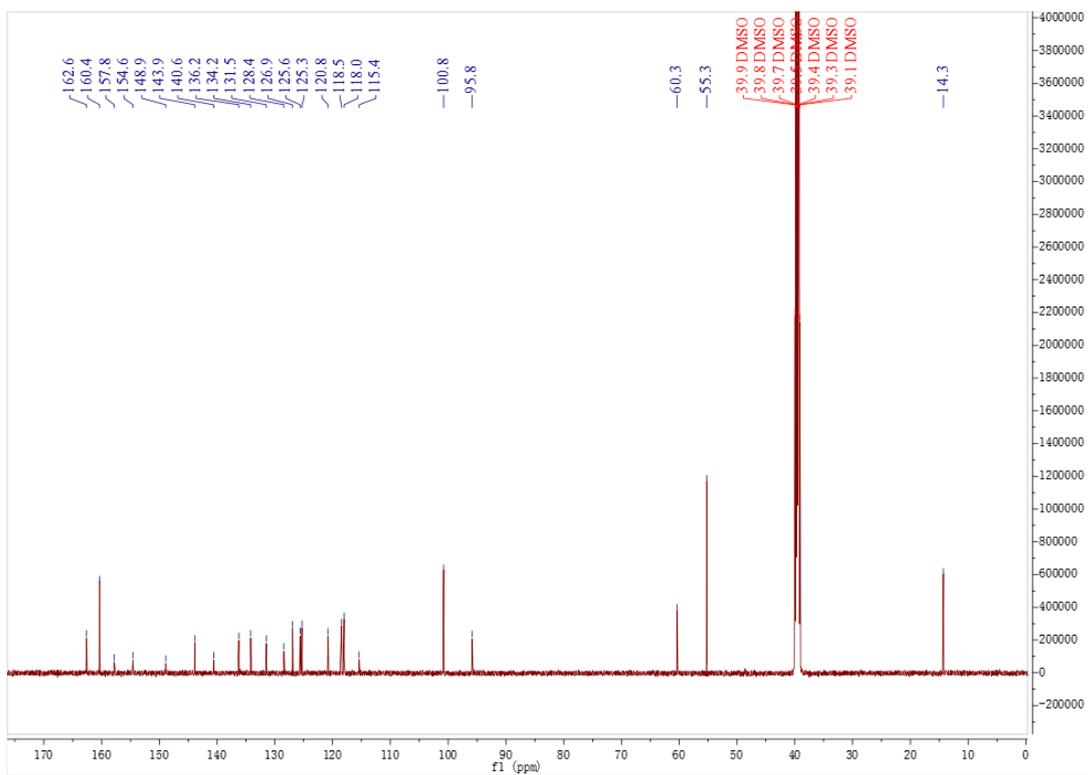


L3-36 #22 RT: 0.10 AV: 1 NL: 9.61E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

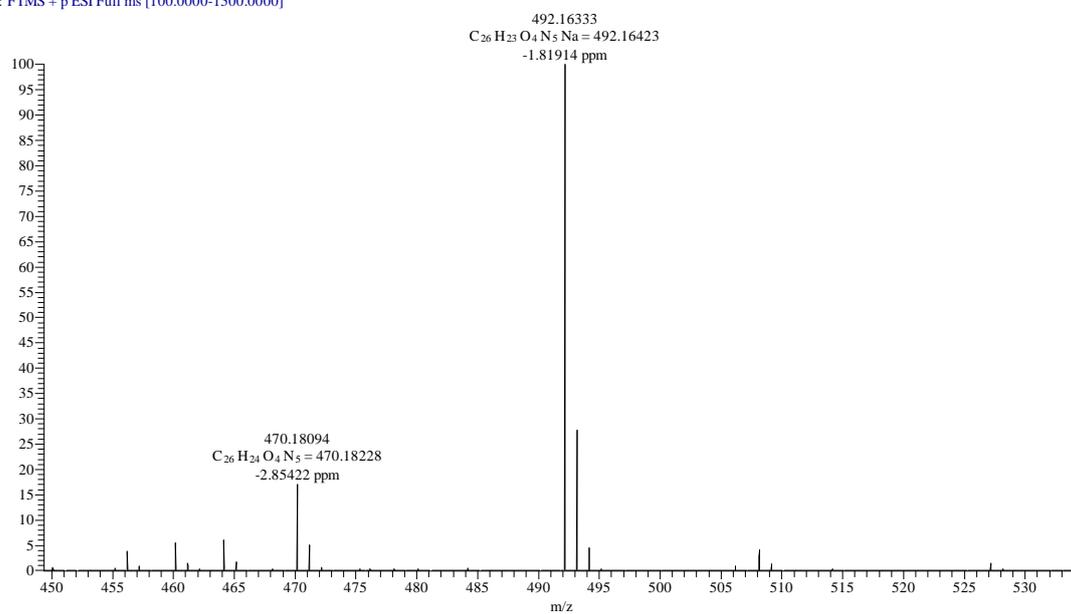


### Spectra of compound **10k** ( $^1H$ NMR, $^{13}C$ NMR, HRMS)

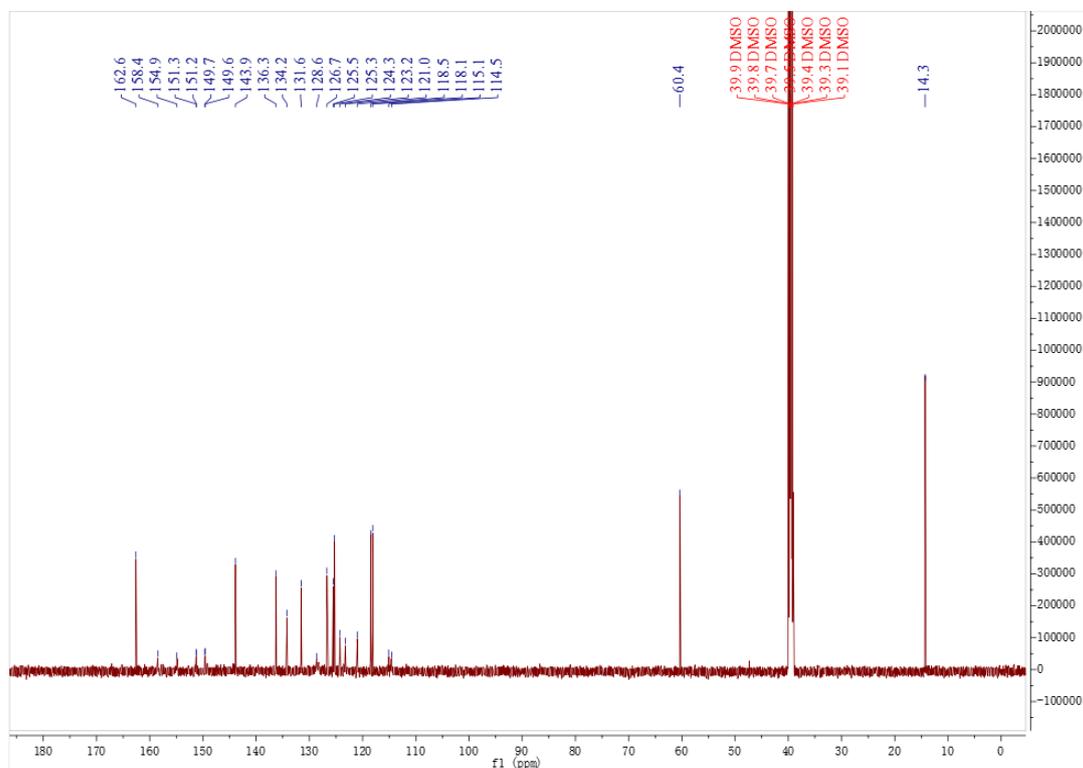
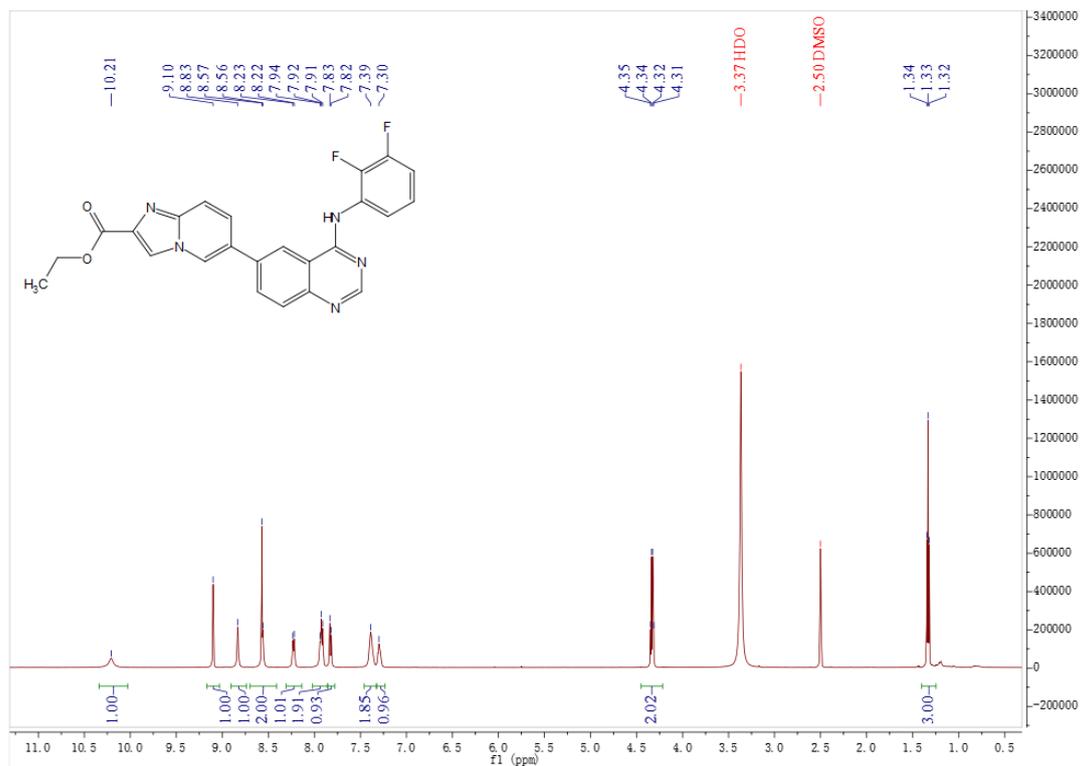


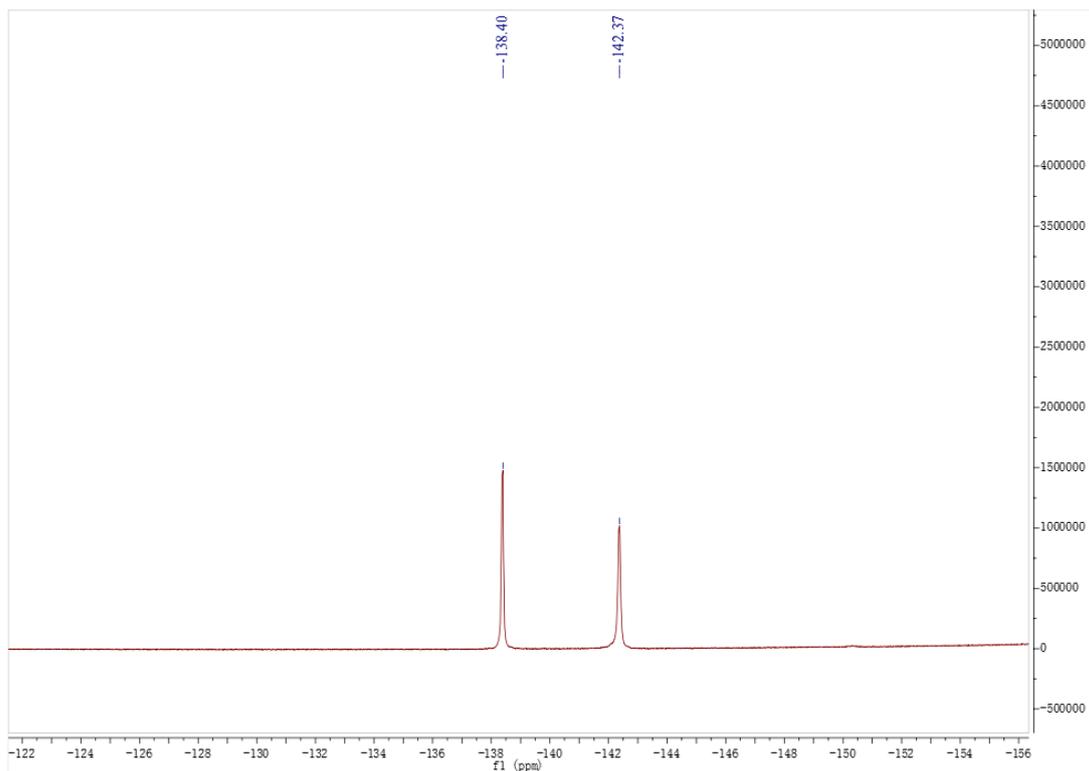


L3-43 #34 RT: 0.15 AV: 1 NL: 4.52E8  
 T: FTMS + p ESI Full ms [100.0000-1500.0000]

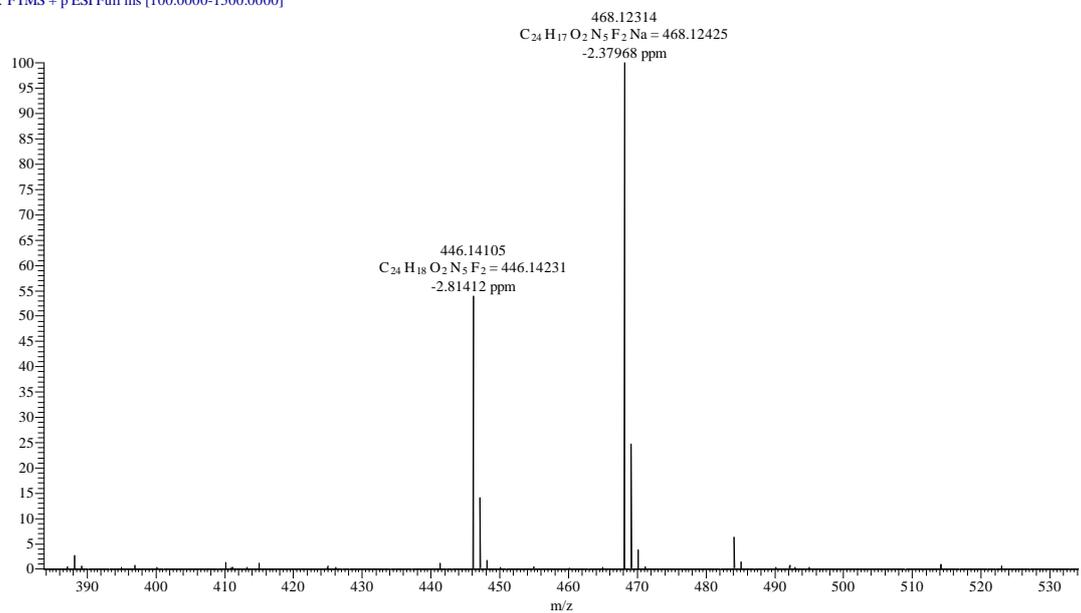


Spectra of compound **101** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR,  $^{19}\text{F}$  NMR, HRMS)

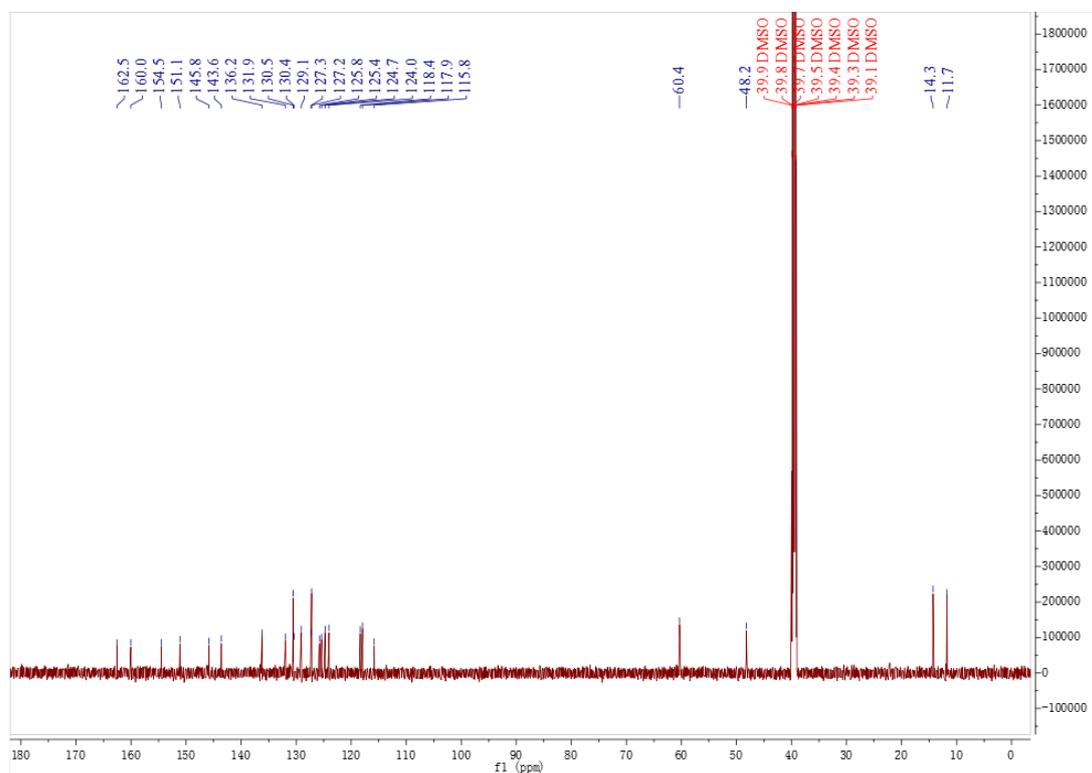
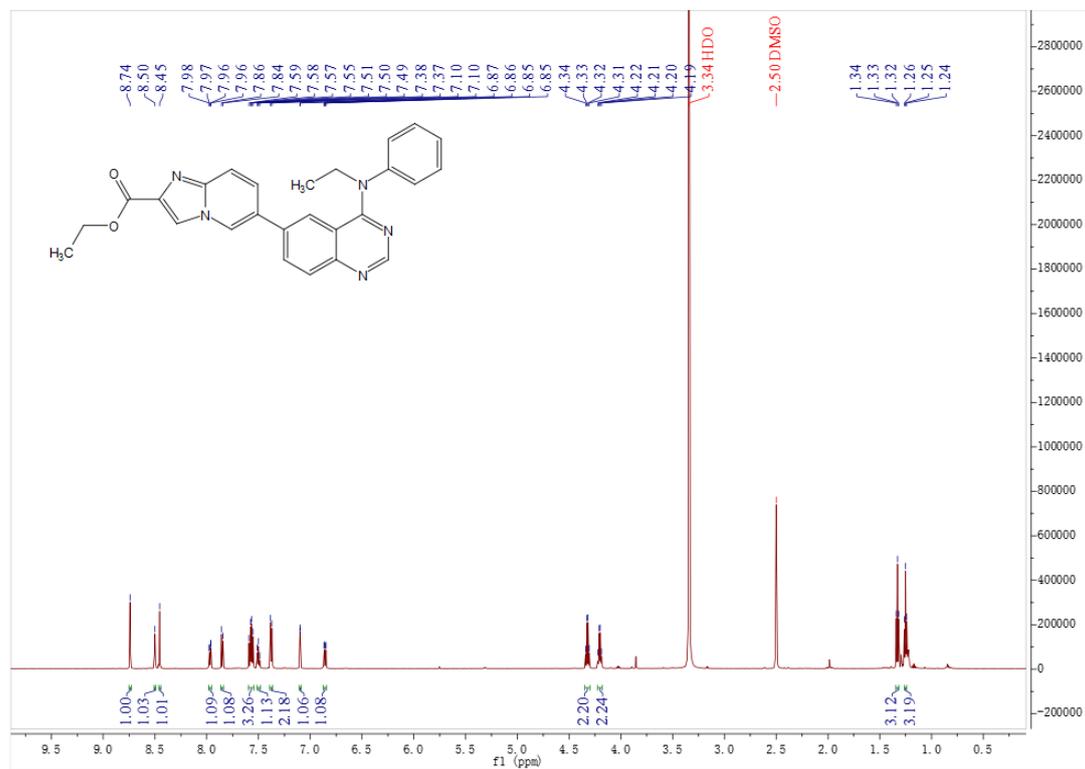




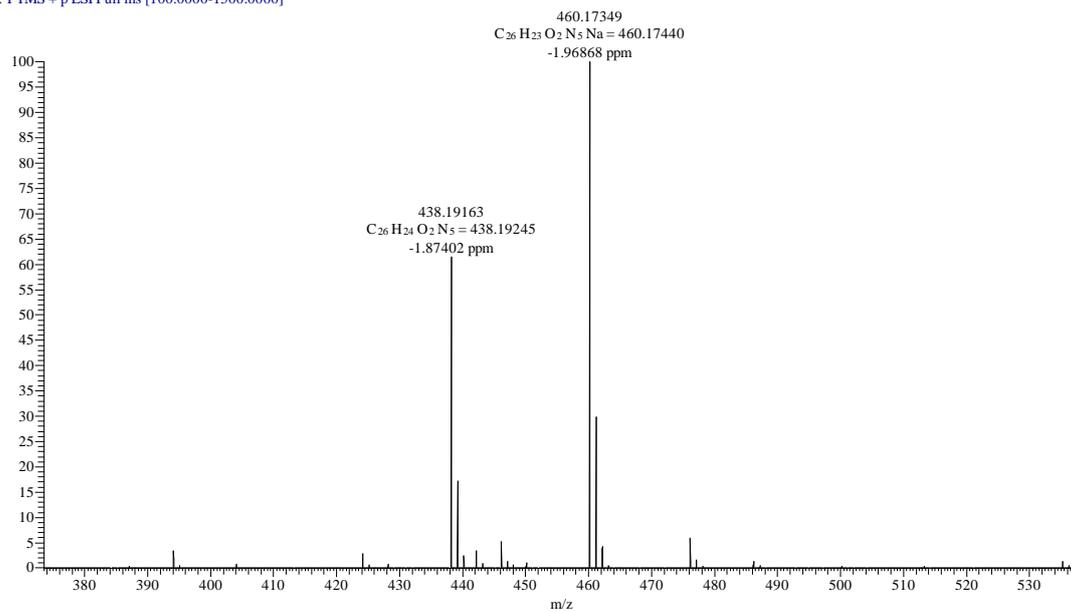
L3-45 #40 RT: 0.18 AV: 1 NL: 2.07E8  
 T: FTMS + p ESI Full ms [100.0000-1500.0000]



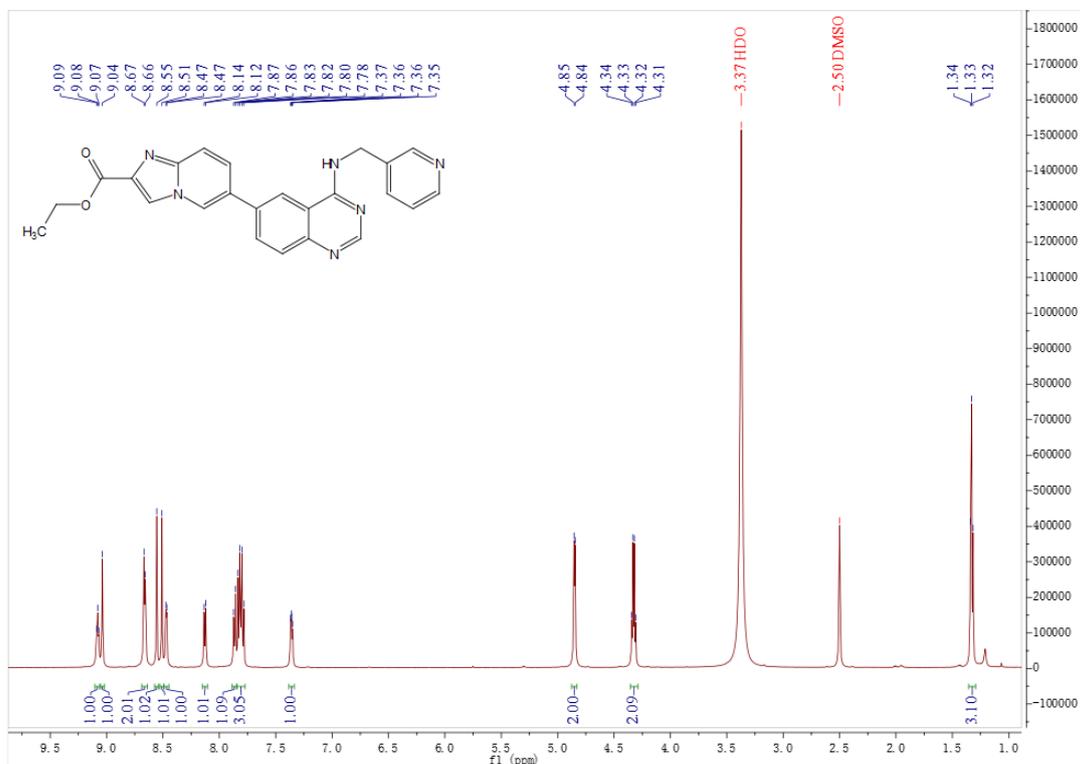
Spectra of compound **10m** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)

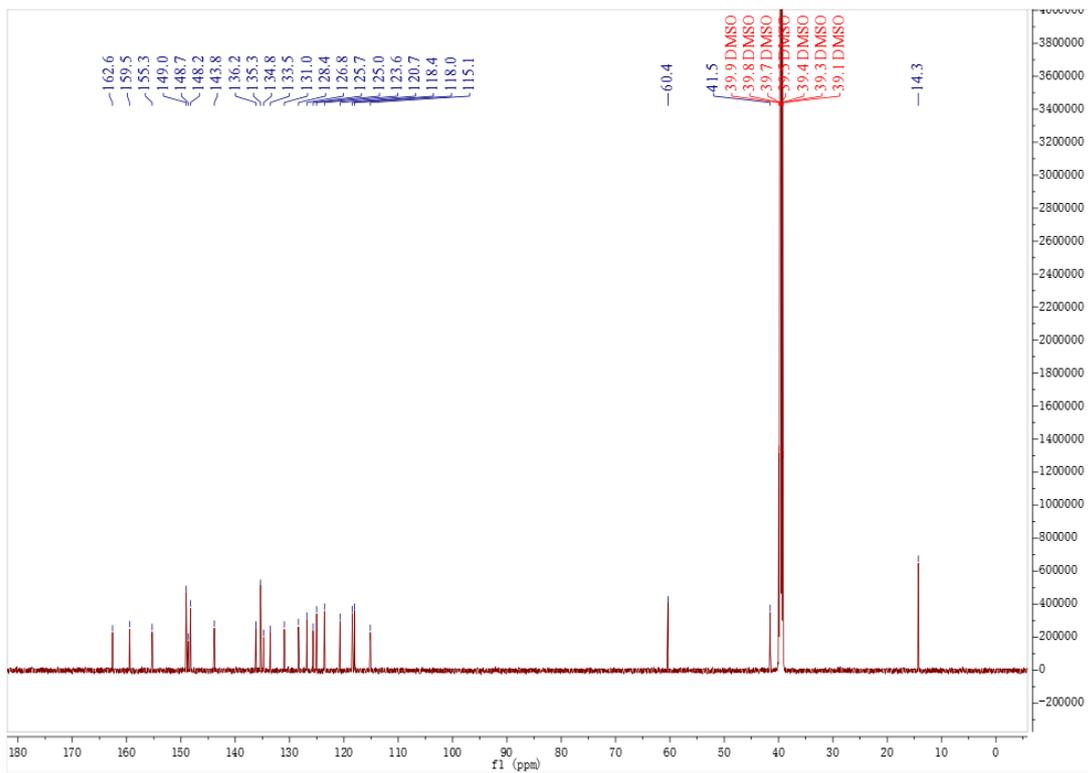


L3-55 #59-60 RT: 0.26-0.26 AV: 2 NL: 6.65E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

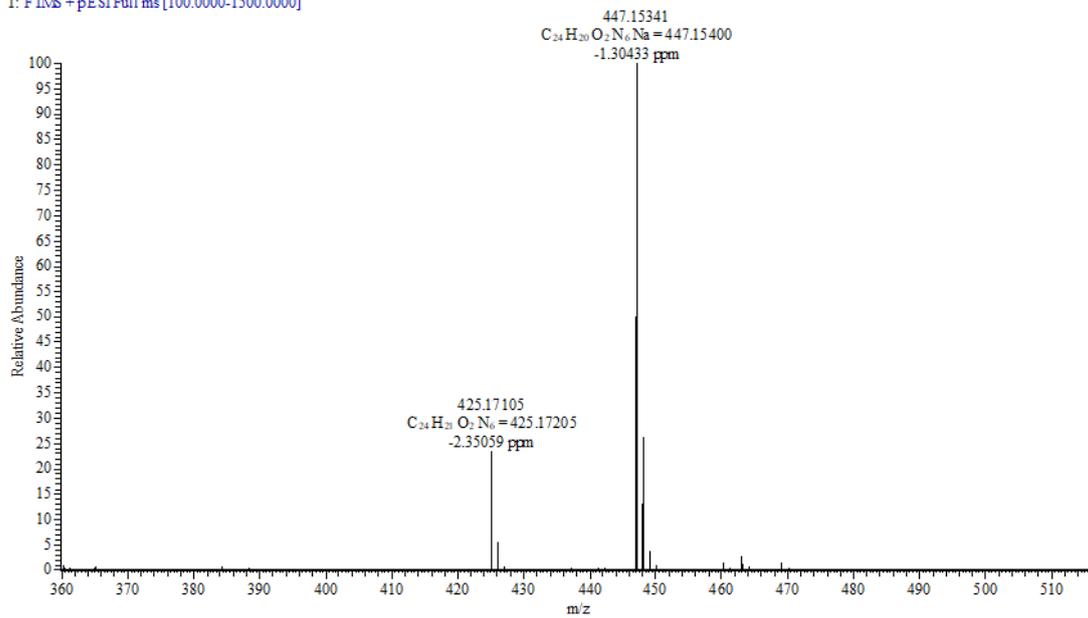


### Spectra of compound **10n** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, HRMS)

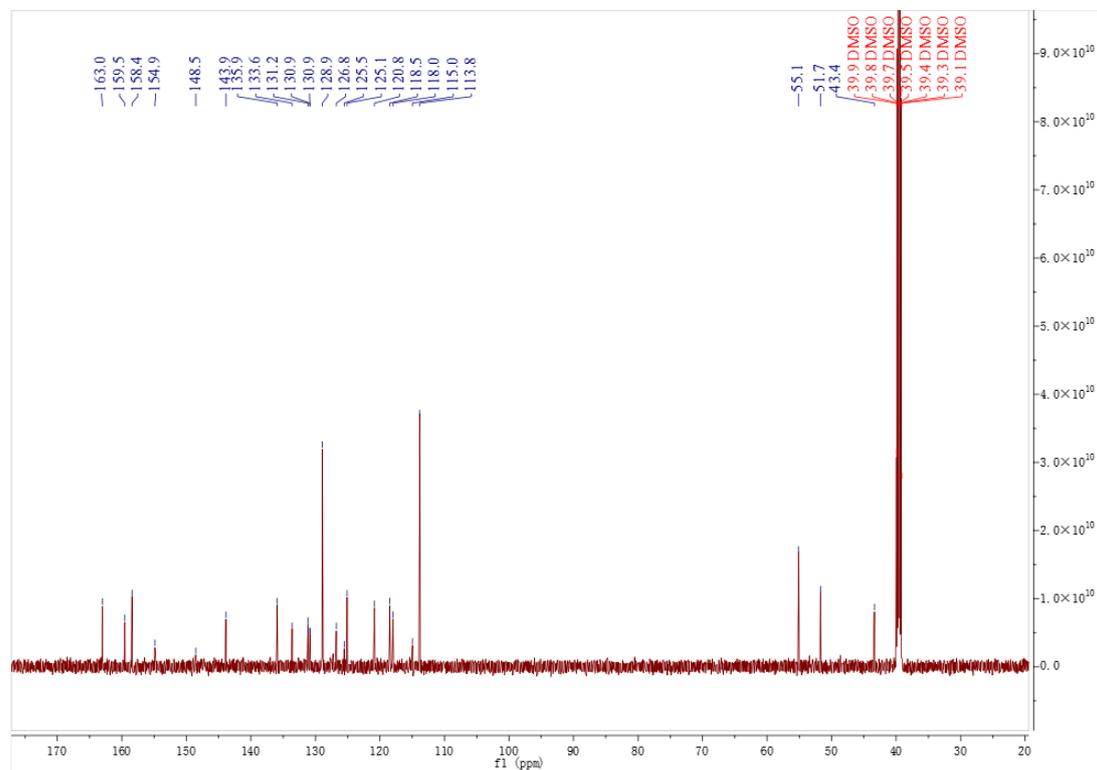
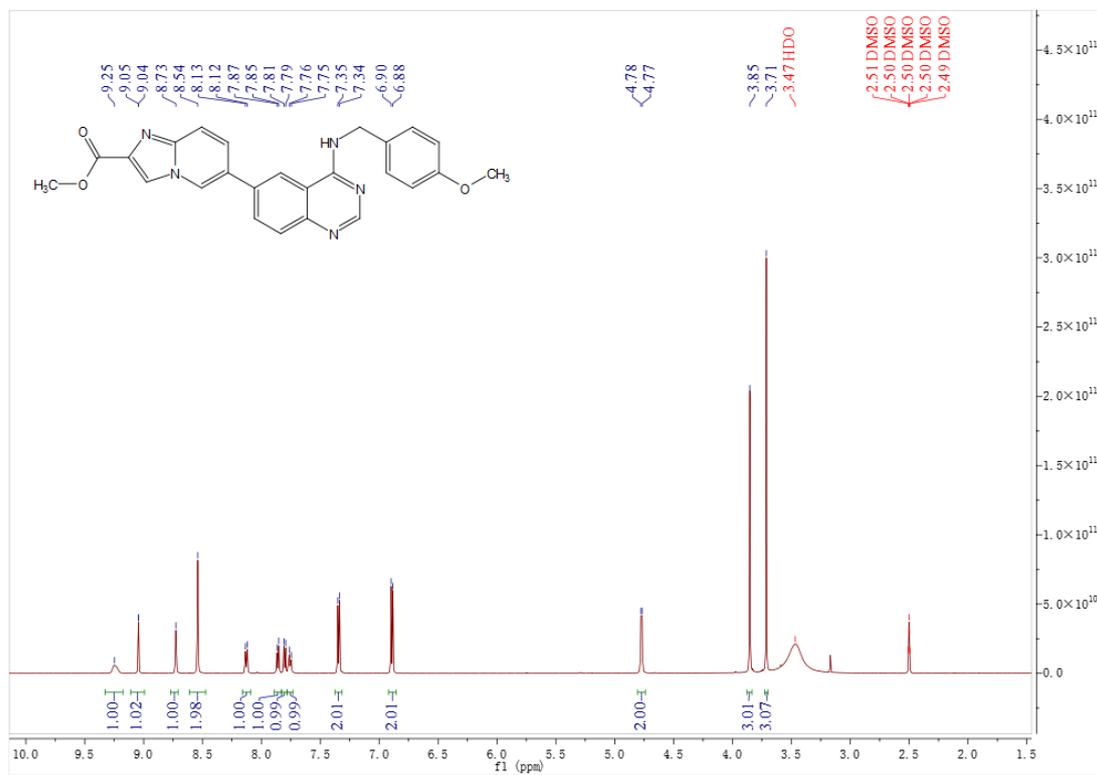




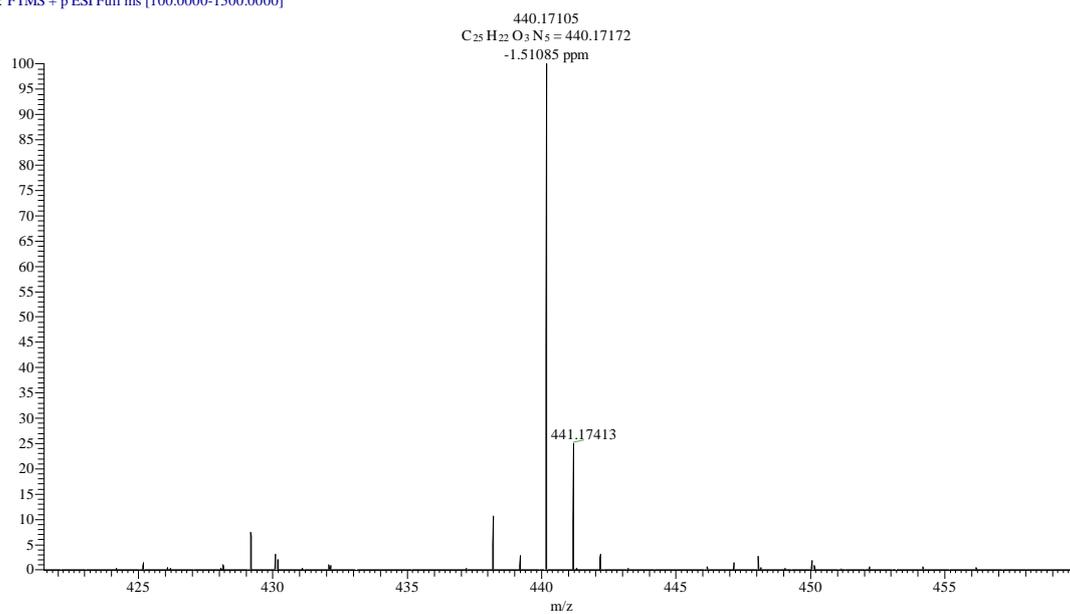
L3-64 #32 RT: 0.14 AV: 1 NL: 8.06E8  
 T: FIMS+pESI Full ms [100.0000-1500.0000]



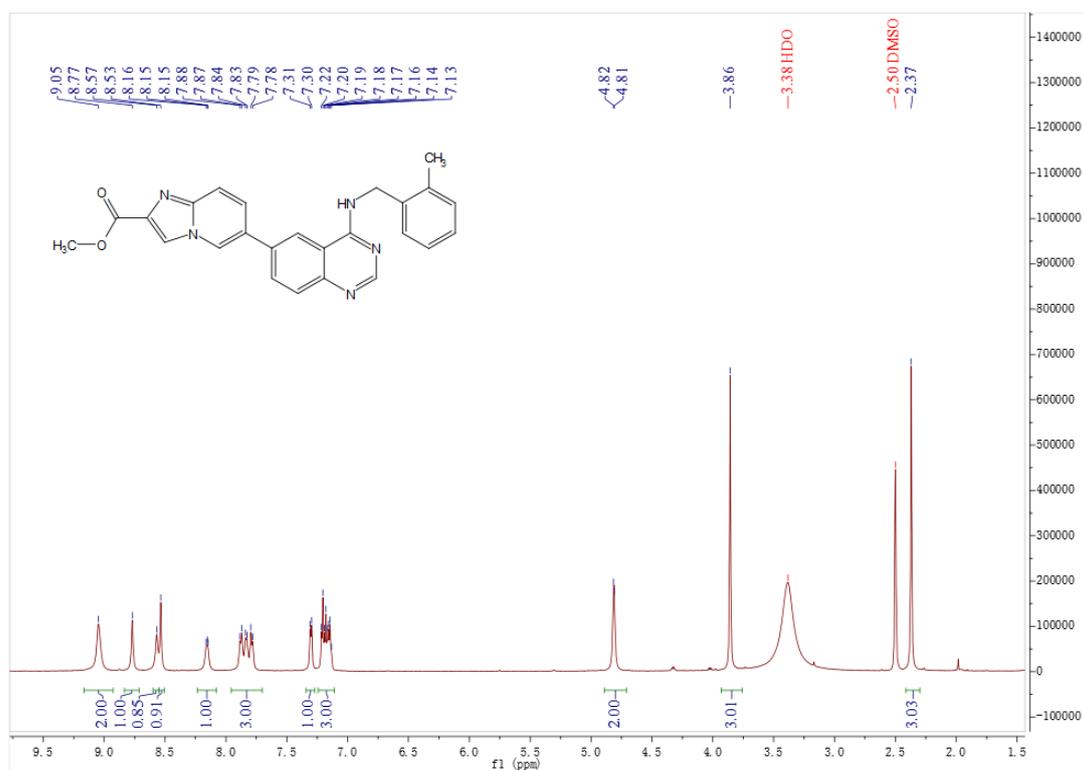
Spectra of compound **10o** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)

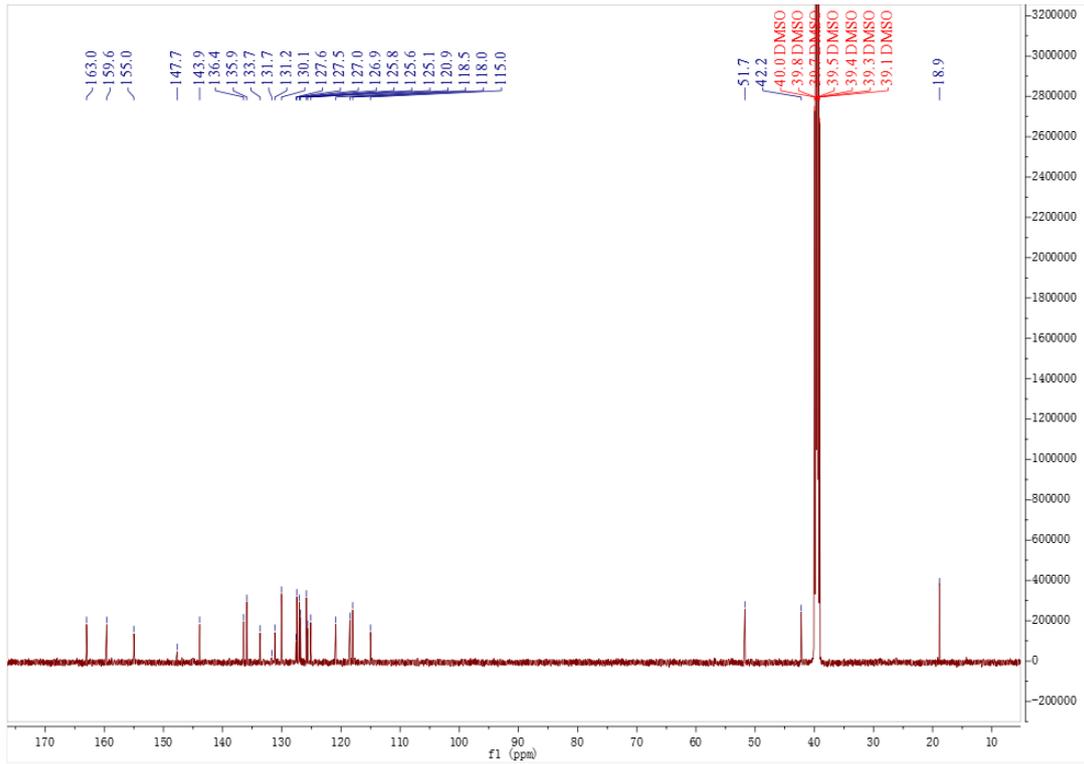


L3-19 #26 RT: 0.11 AV: 1 NL: 1.21E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

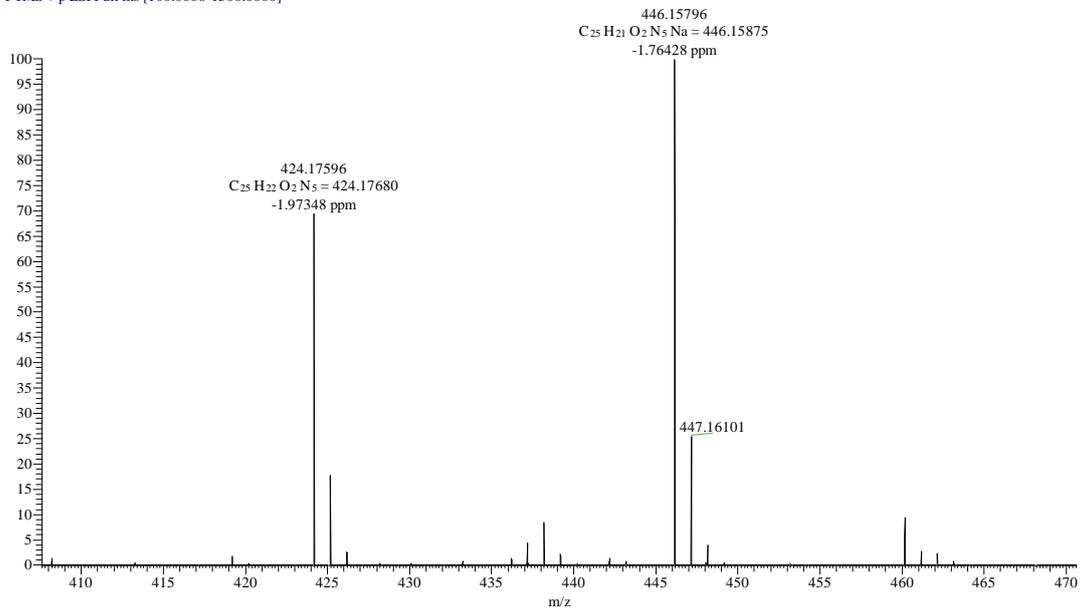


### Spectra of compound **10p** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, HRMS)

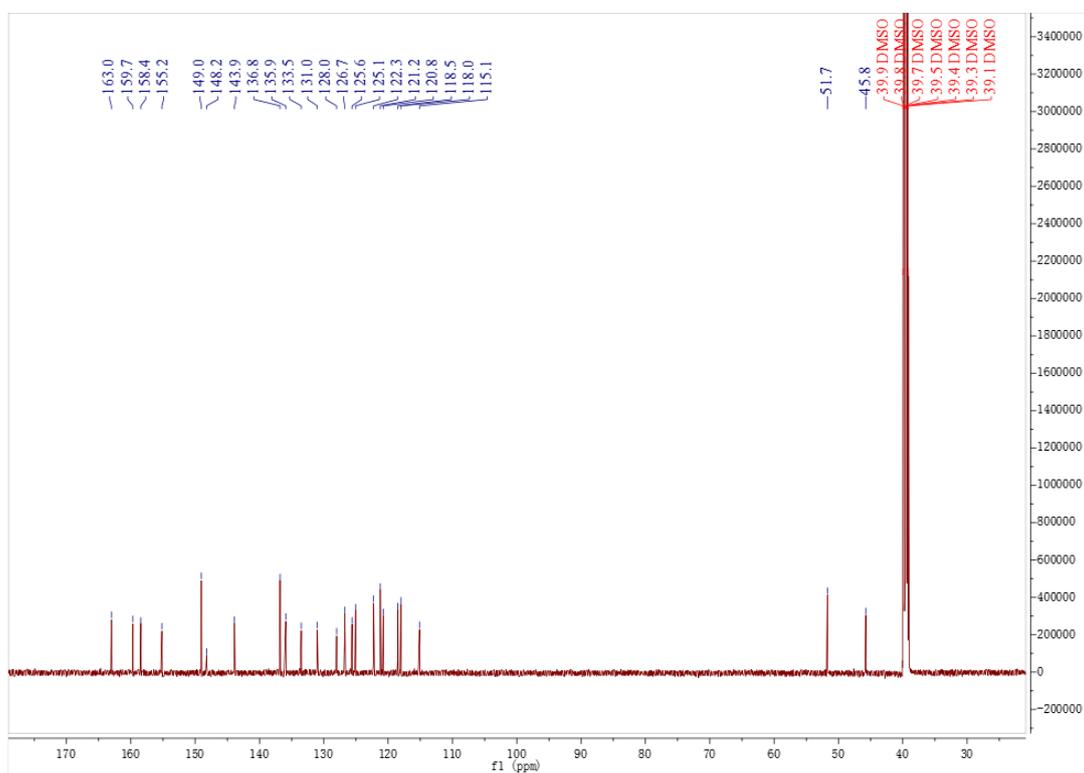
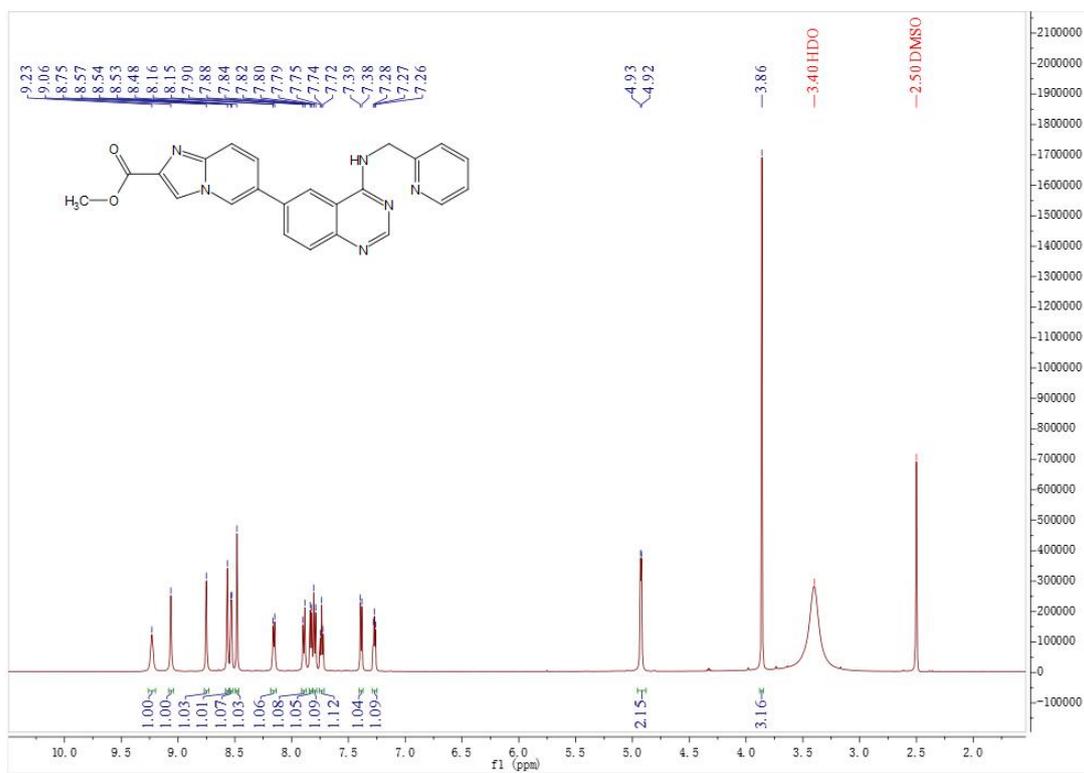




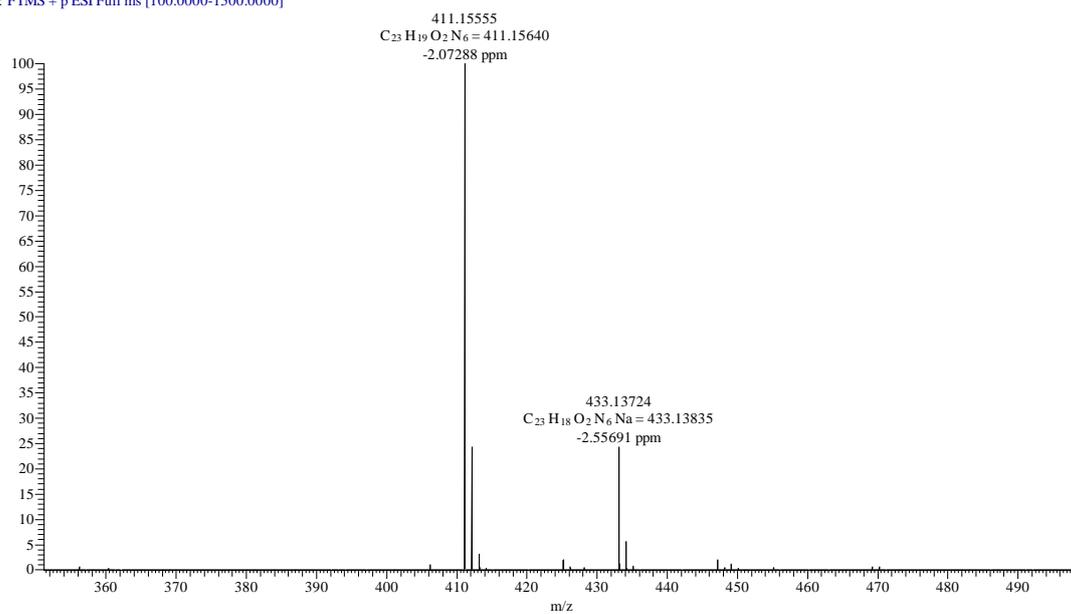
L3-27 #24 RT: 0.11 AV: 1 NL: 1.21E9  
 T: FTMS + p ESI Full ms [100.0000-1500.0000]



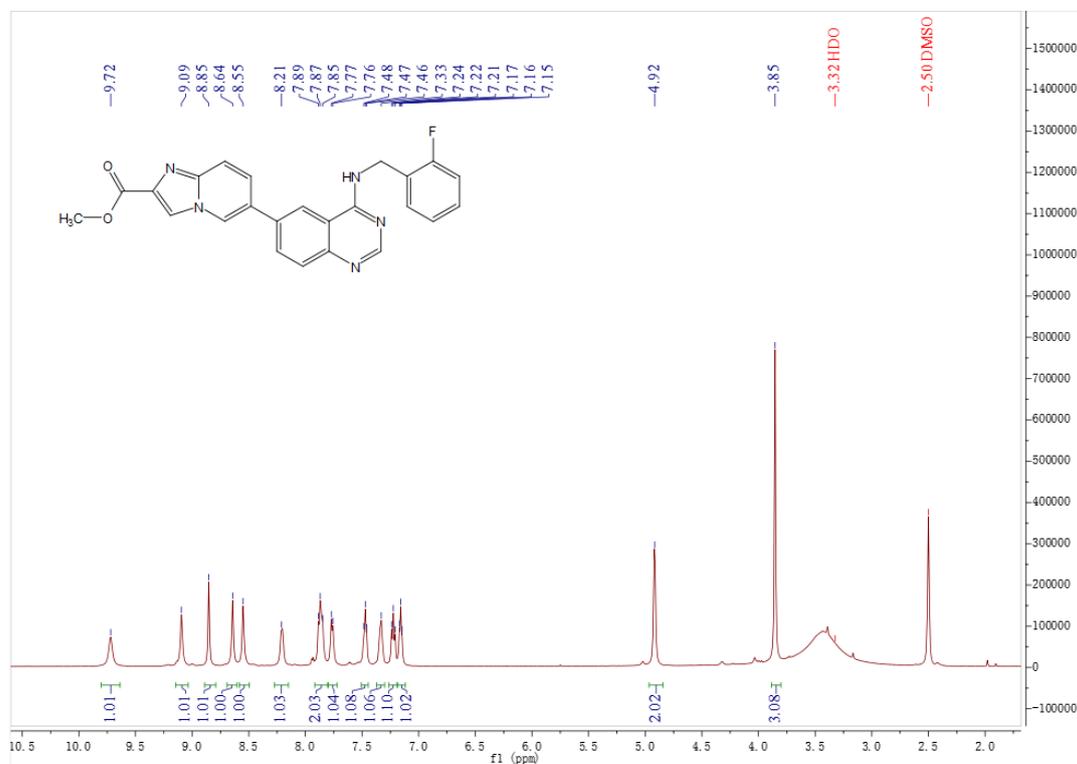
Spectra of compound **10q** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)

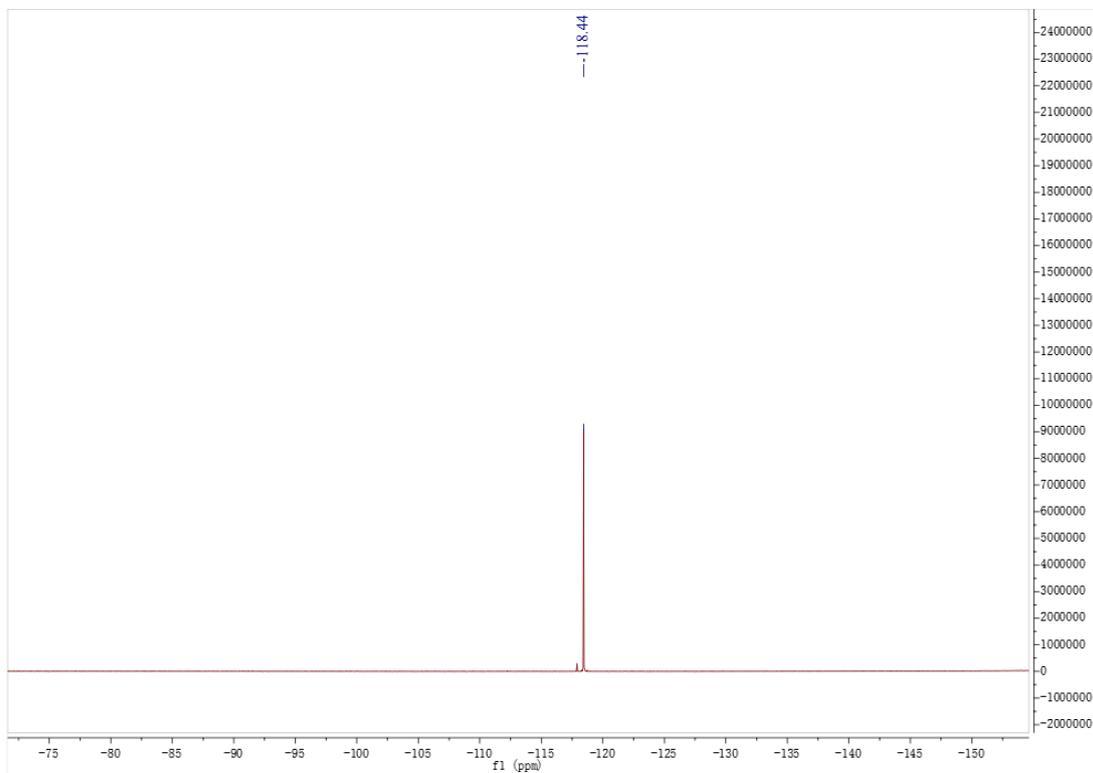
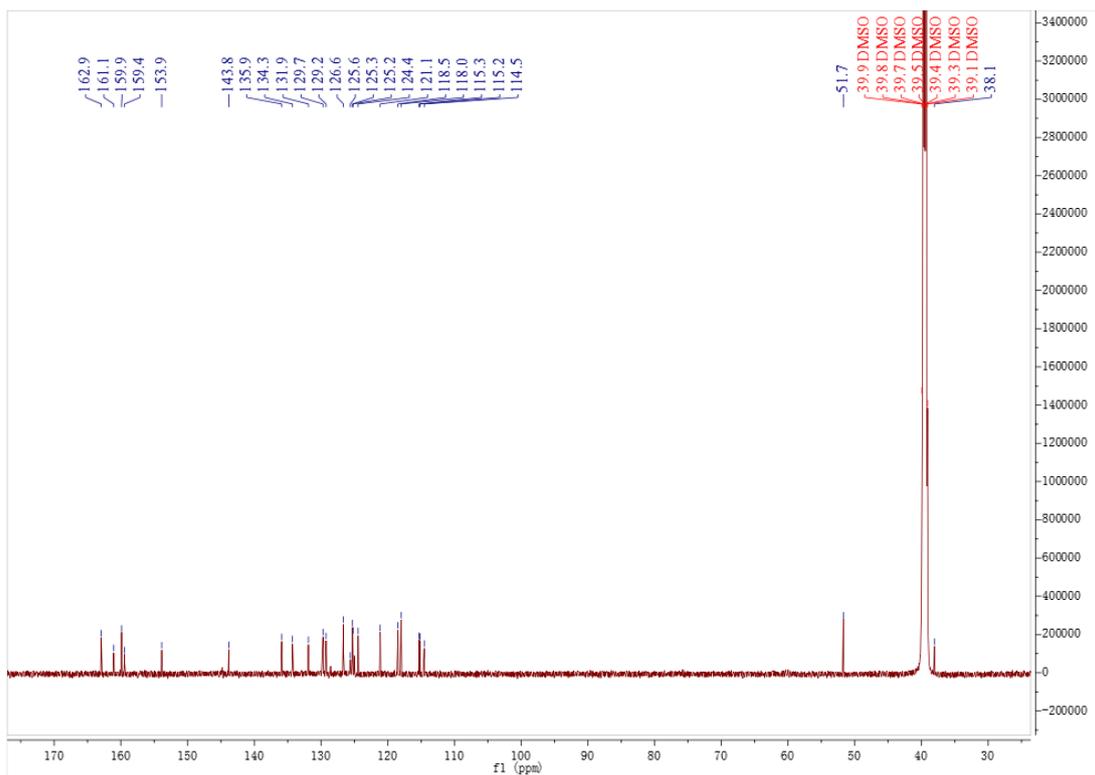


L3-28\_211231152801 #21 RT: 0.09 AV: 1 NL: 1.98E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

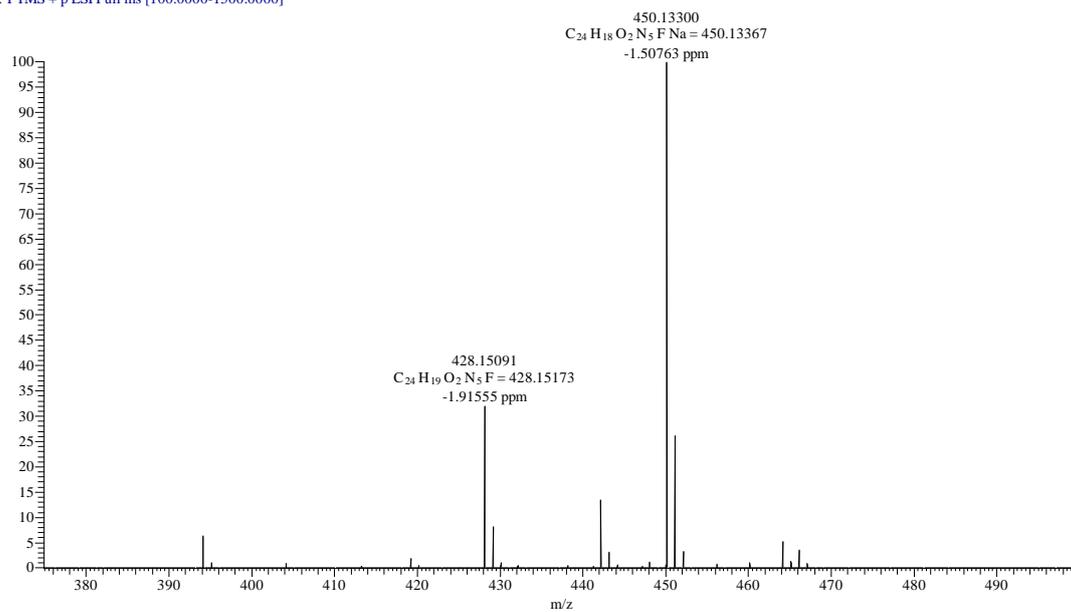


### Spectra of compound **10r** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, <sup>19</sup>F NMR, HRMS)

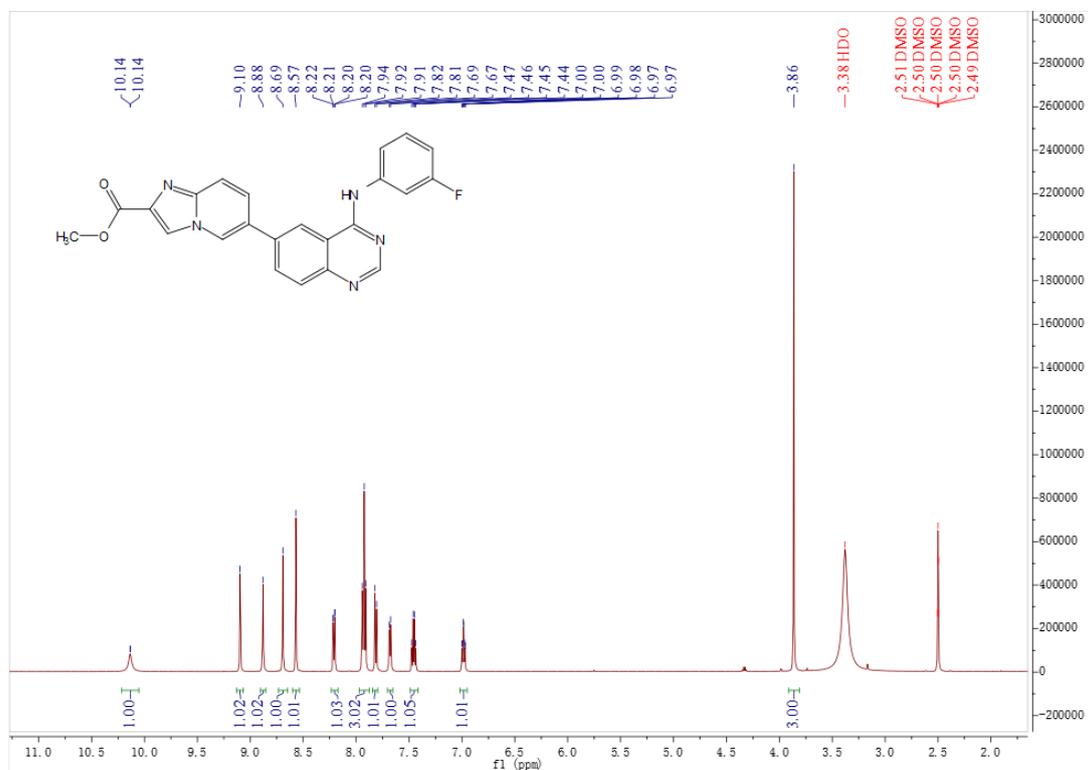


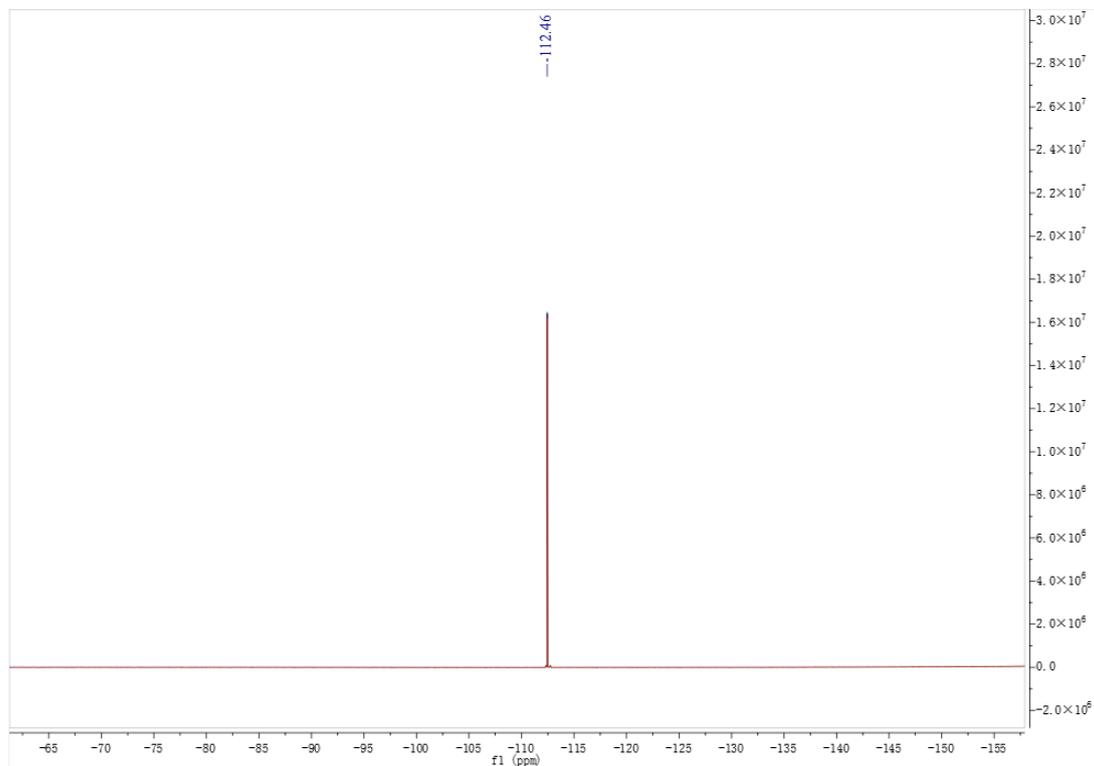
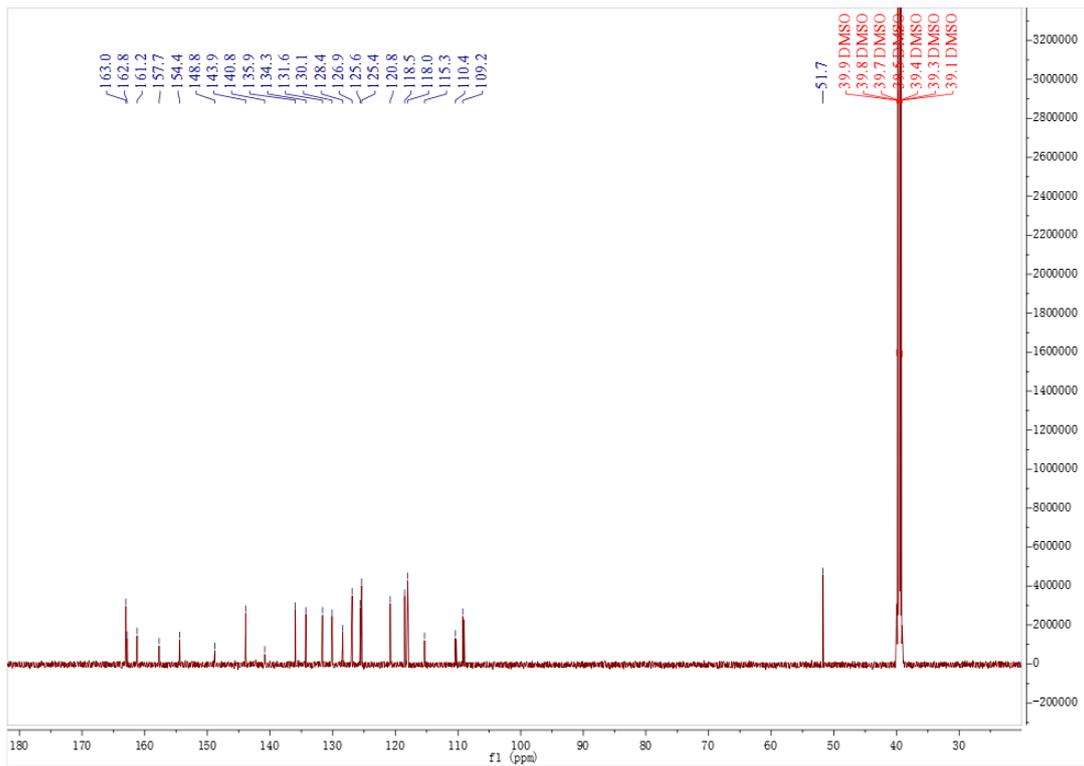


L3-37 #25 RT: 0.11 AV: 1 NL: 1.71E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

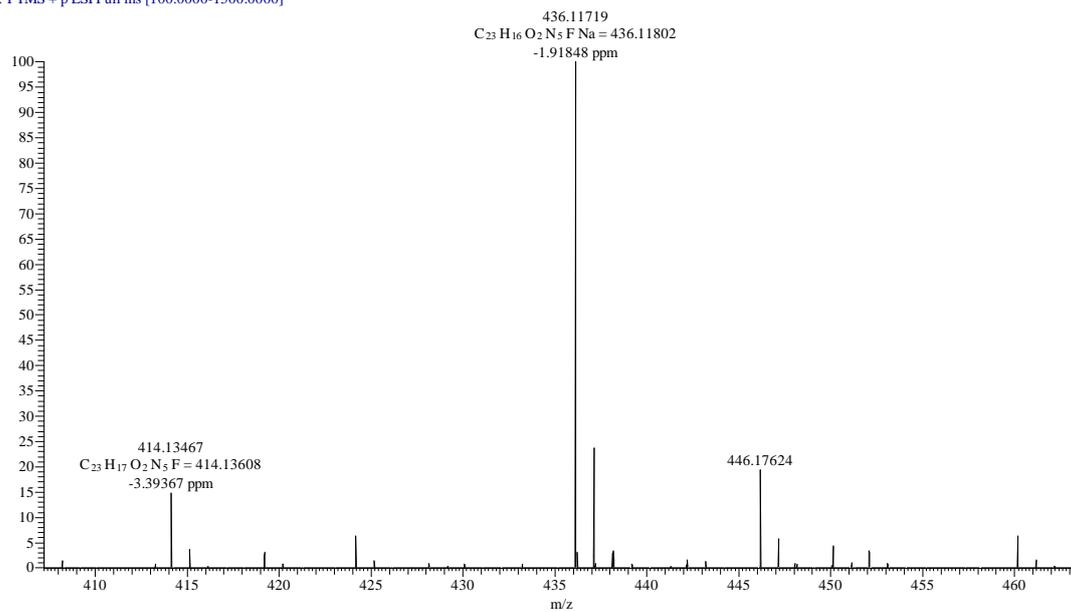


### Spectra of compound 10s ( $^1H$ NMR, $^{13}C$ NMR, $^{19}F$ NMR, HRMS)

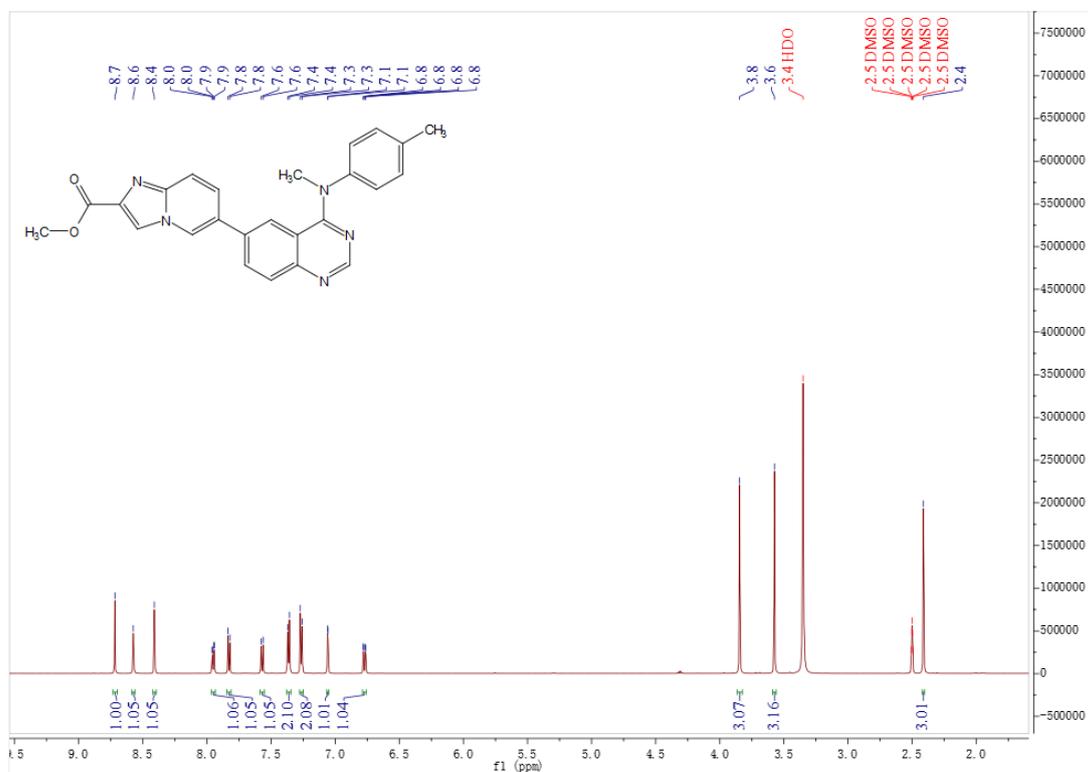


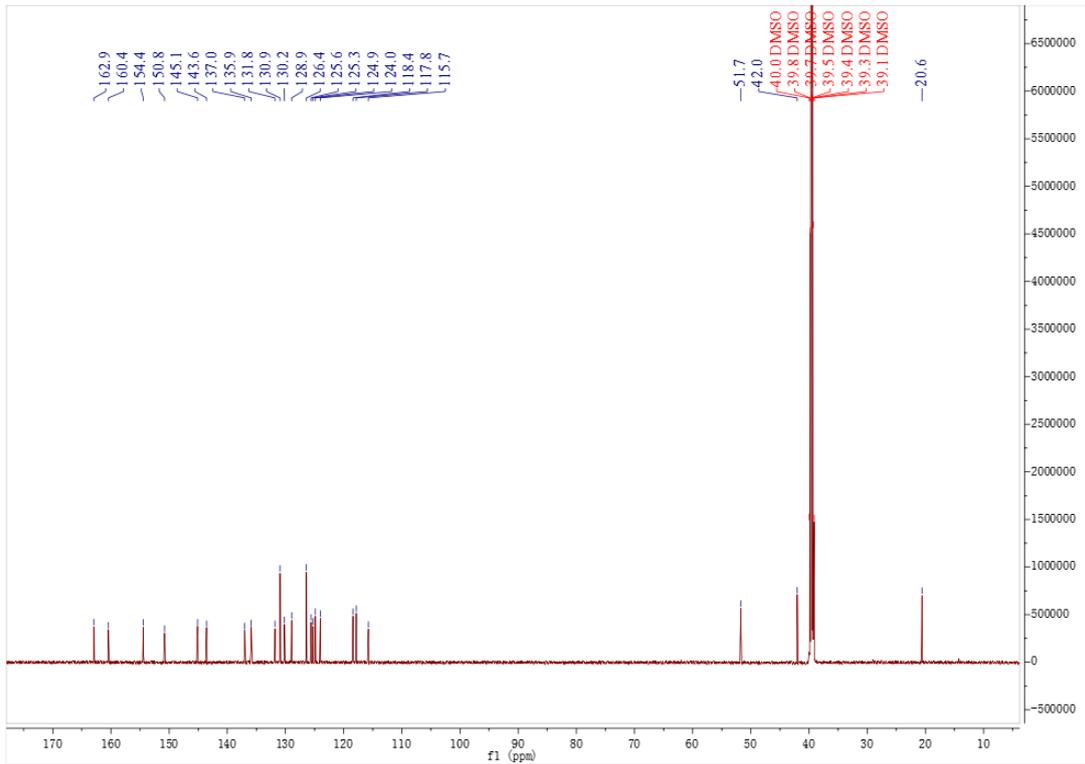


L3-38 #26 RT: 0.11 AV: 1 NL: 9.93E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

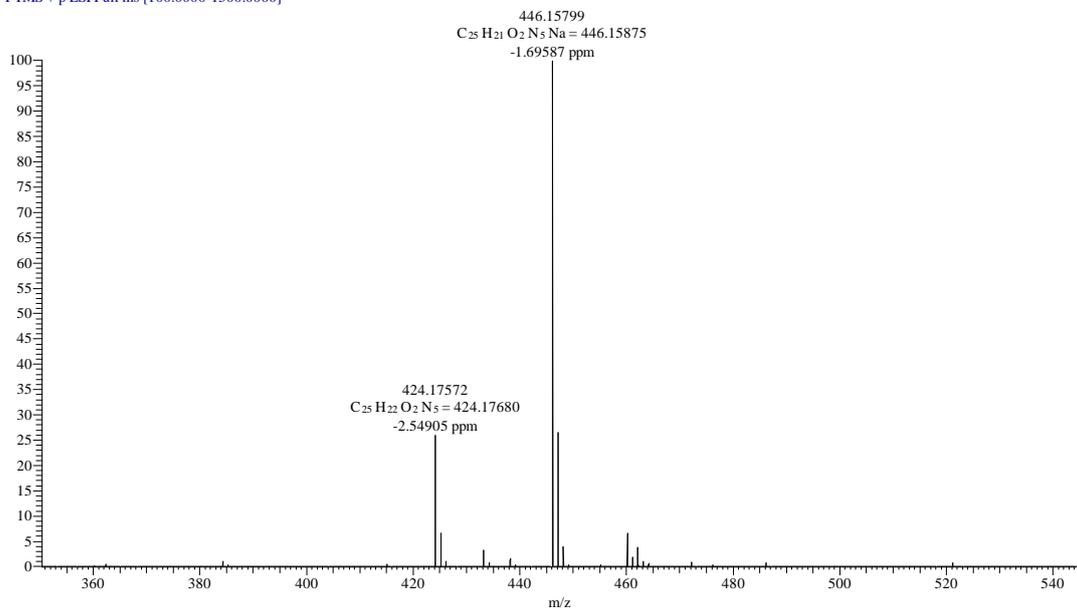


### Spectra of compound **10t** ( $^1H$ NMR, $^{13}C$ NMR, HRMS)

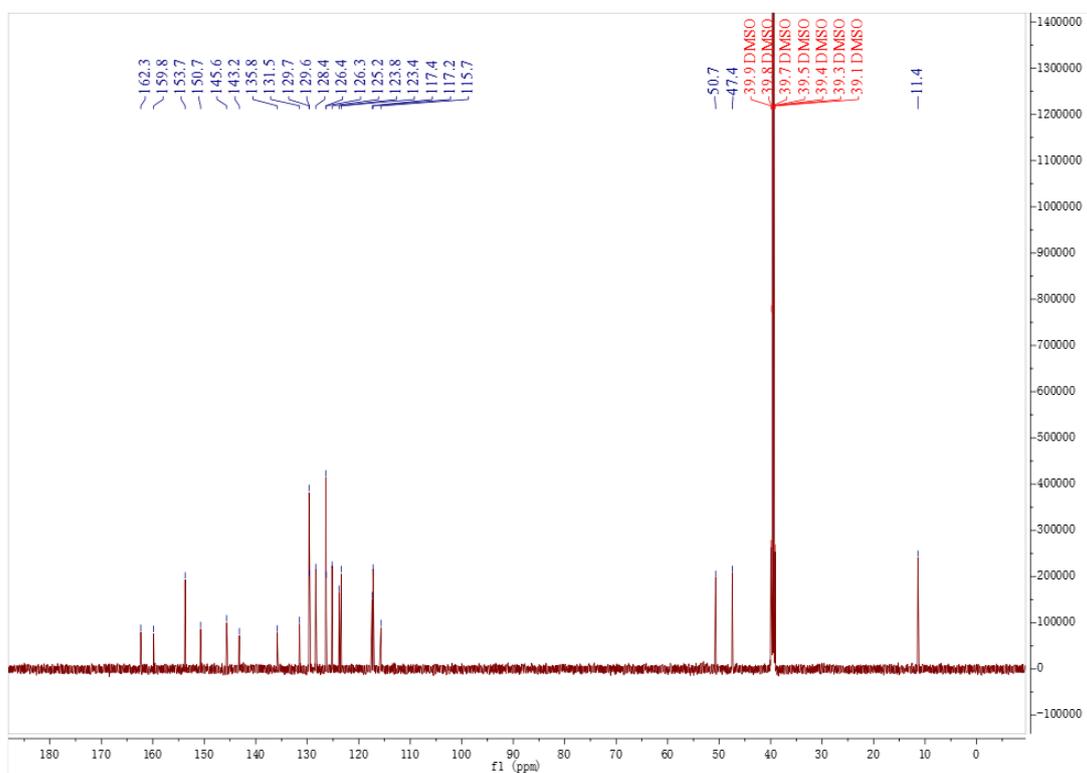
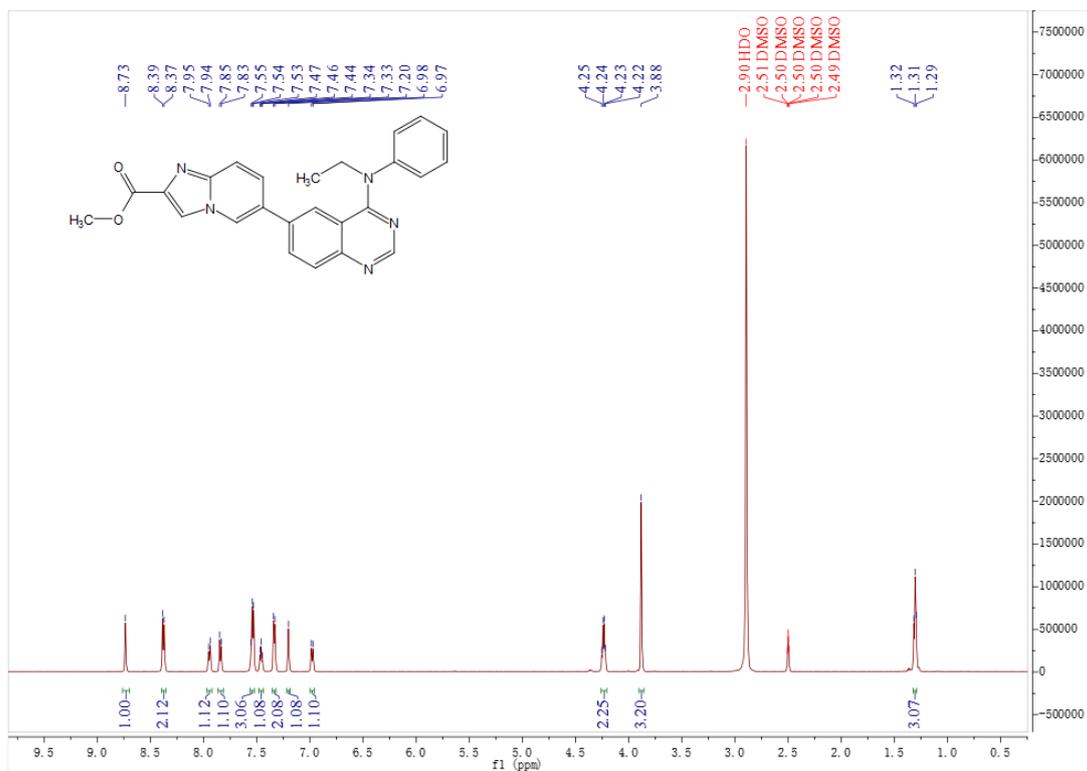




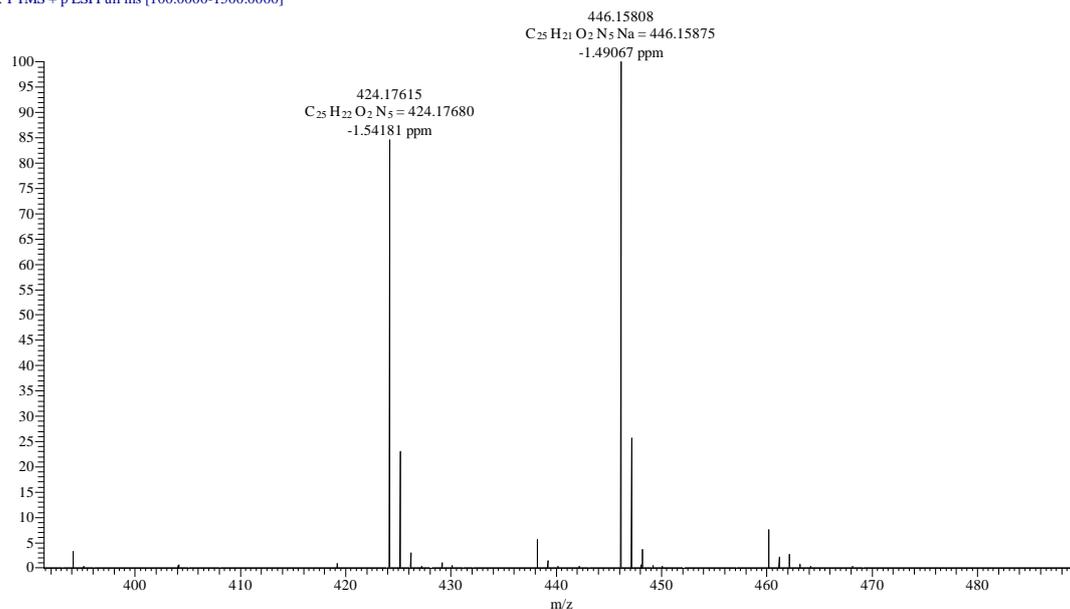
L3-52 #35 RT: 0.15 AV: 1 NL: 9.75E8  
 T: FTMS + p ESI Full ms [100.0000-1500.0000]



Spectra of compound **10u** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)

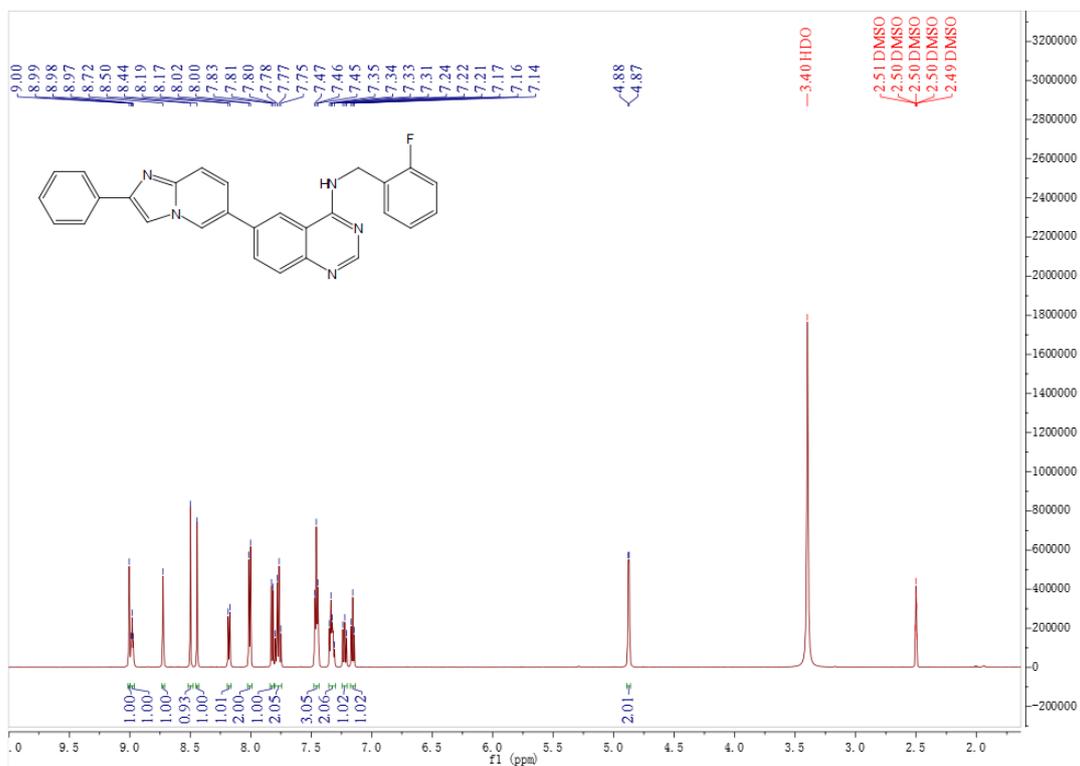


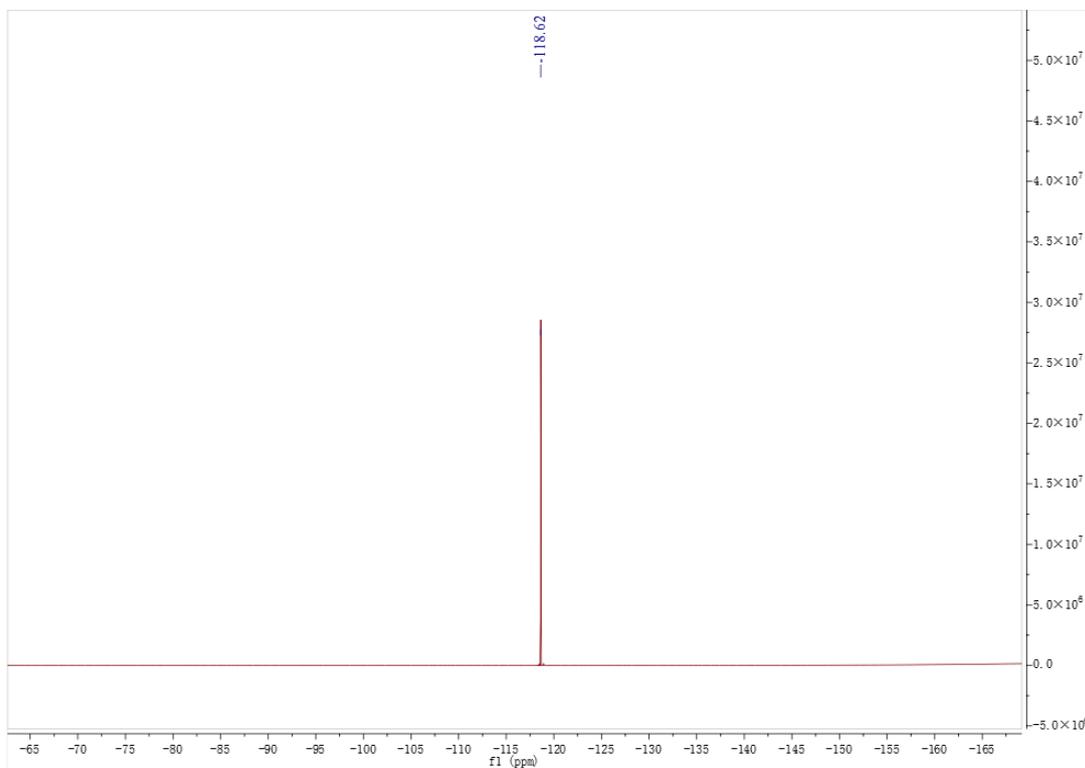
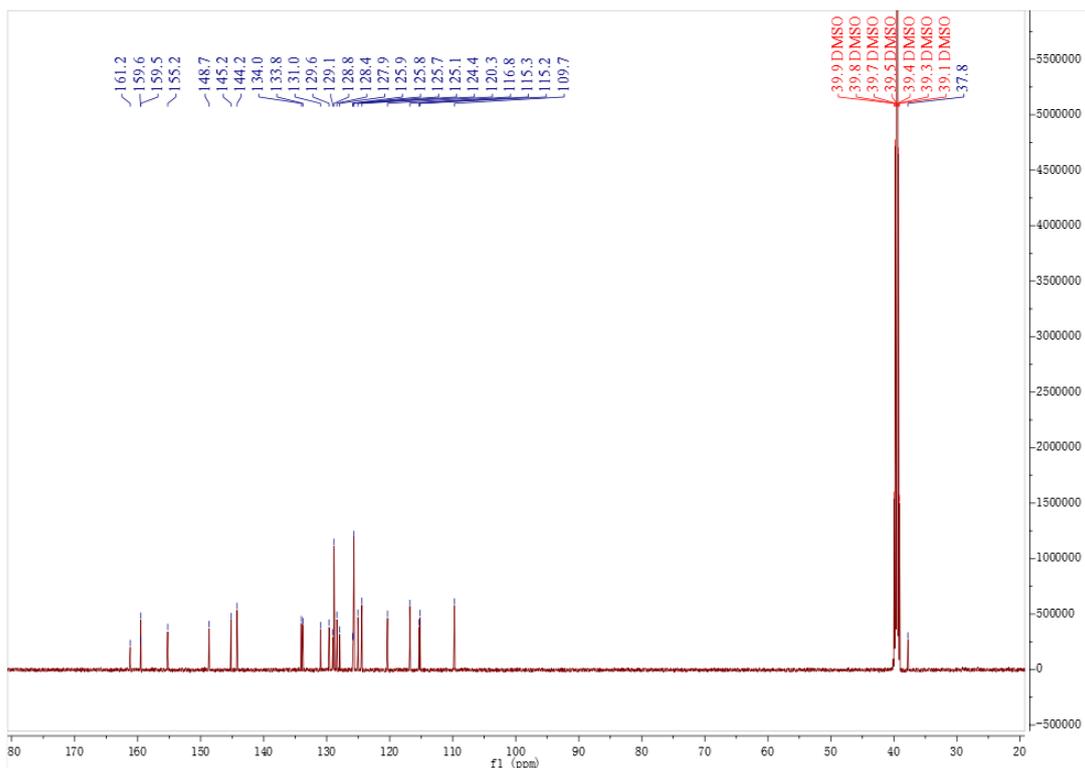
L3-56 #26 RT: 0.12 AV: 1 NL: 2.01E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]



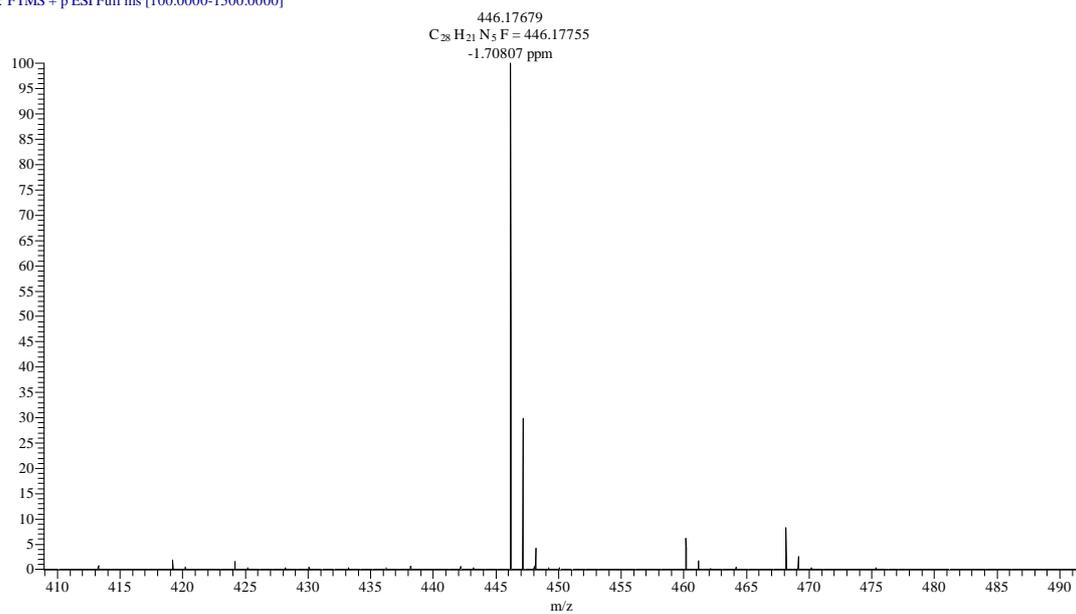
## 5. <sup>1</sup>H NMR and <sup>13</sup>C NMR Spectrum of the compounds 13a-13k.

Spectra of compound 13a (<sup>1</sup>H NMR, <sup>13</sup>C NMR, <sup>19</sup>F NMR, HRMS)

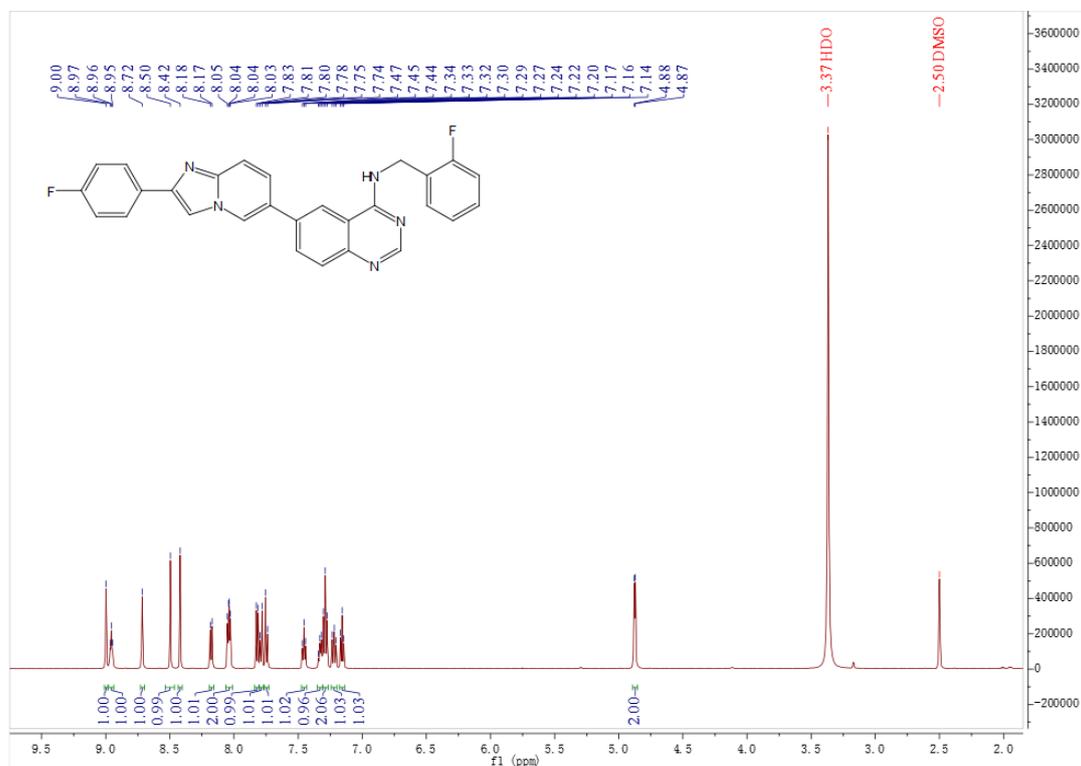


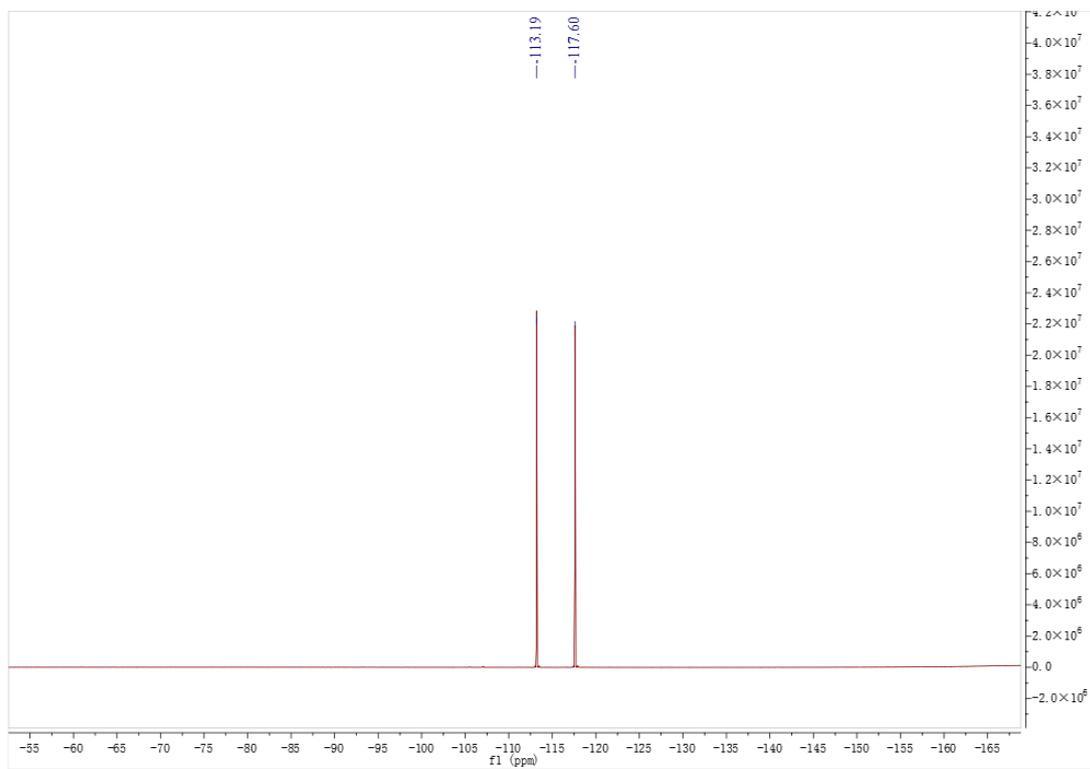
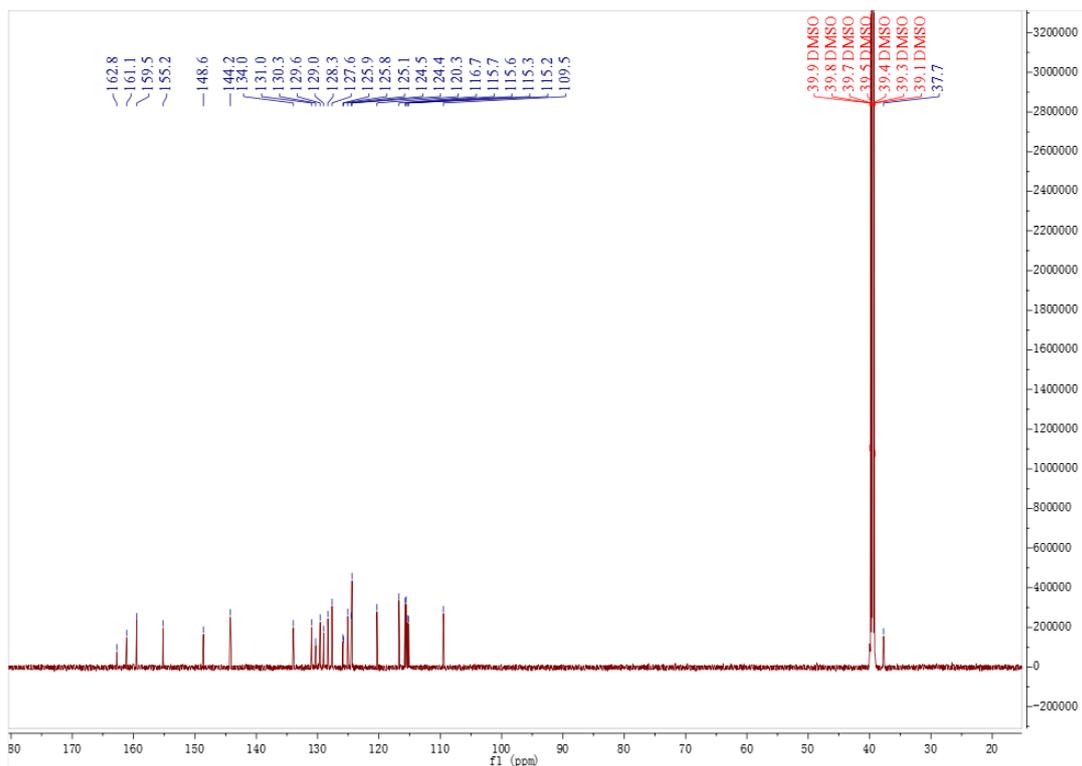


L3-70 #26 RT: 0.11 AV: 1 NL: 2.29E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

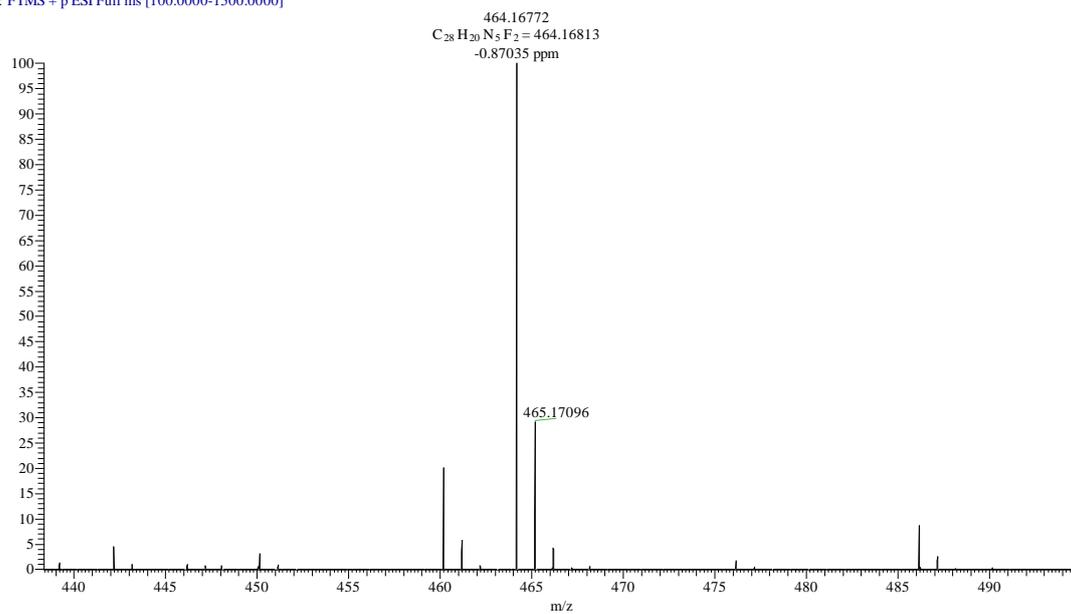


### Spectra of compound **13b** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, <sup>19</sup>F NMR, HRMS)

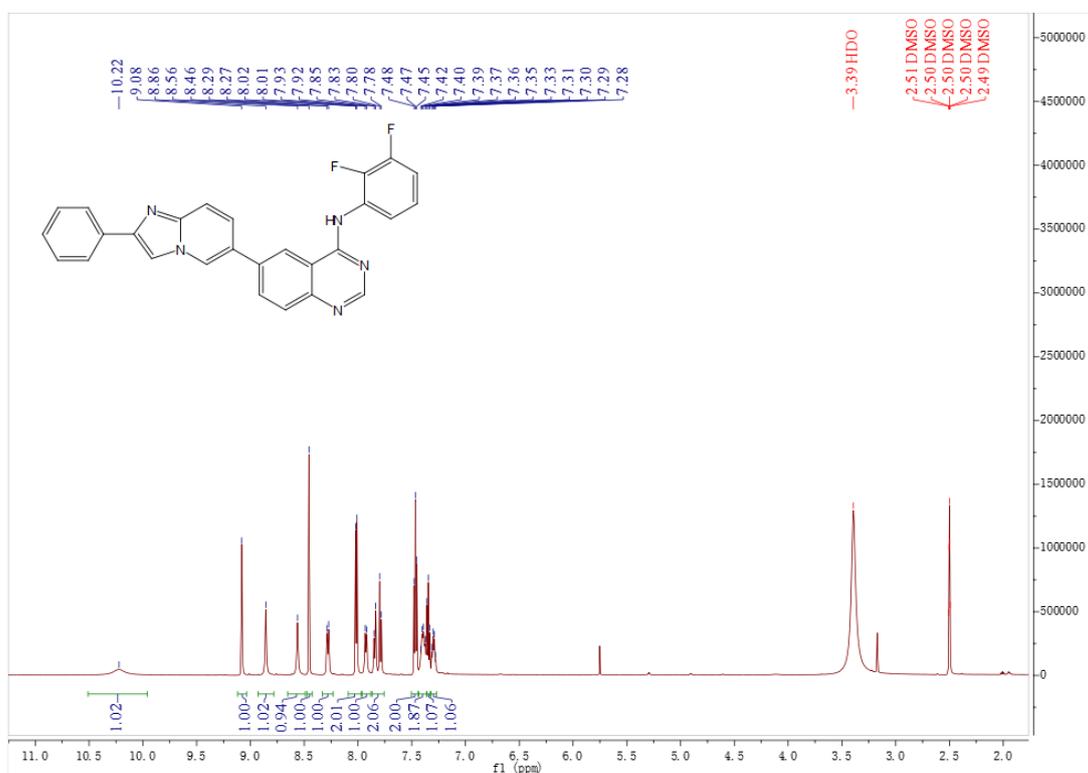


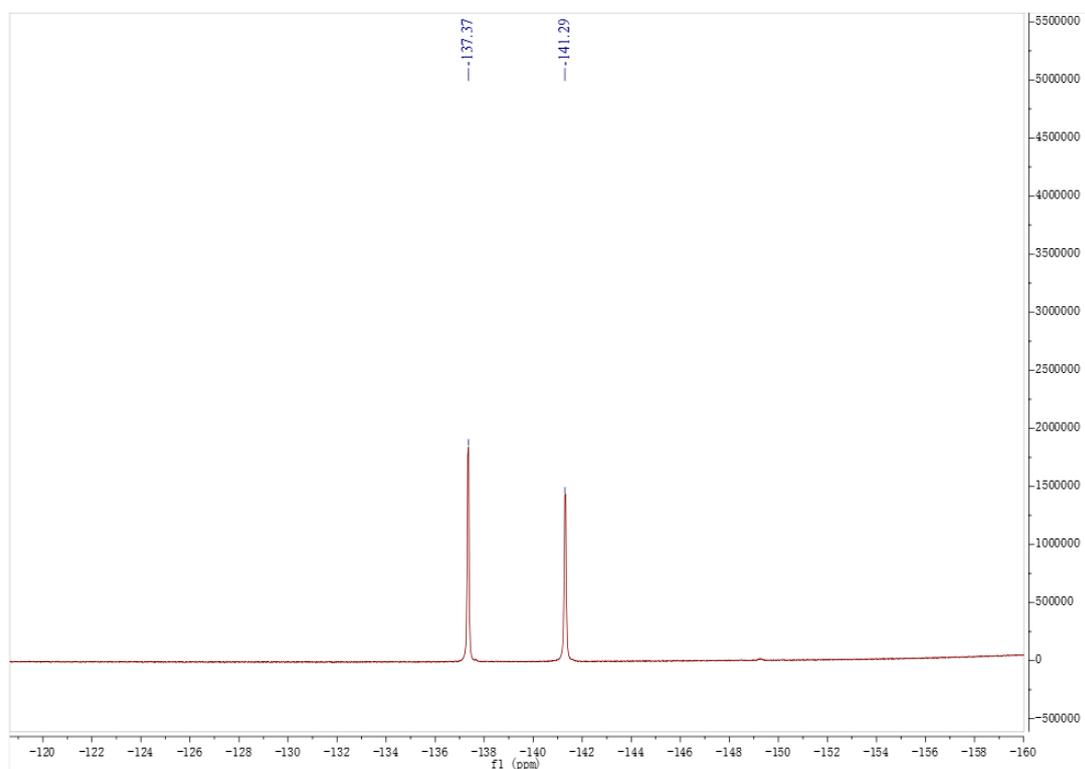
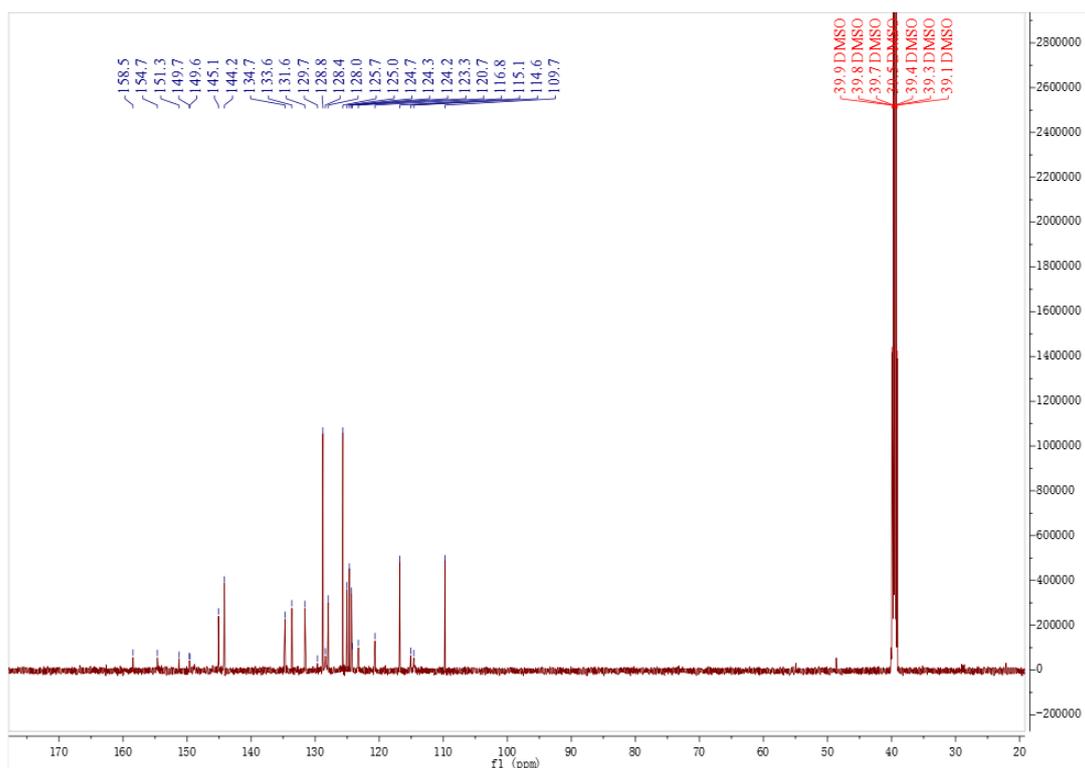


L3-73 #53 RT: 0.23 AV: 1 NL: 4.25E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

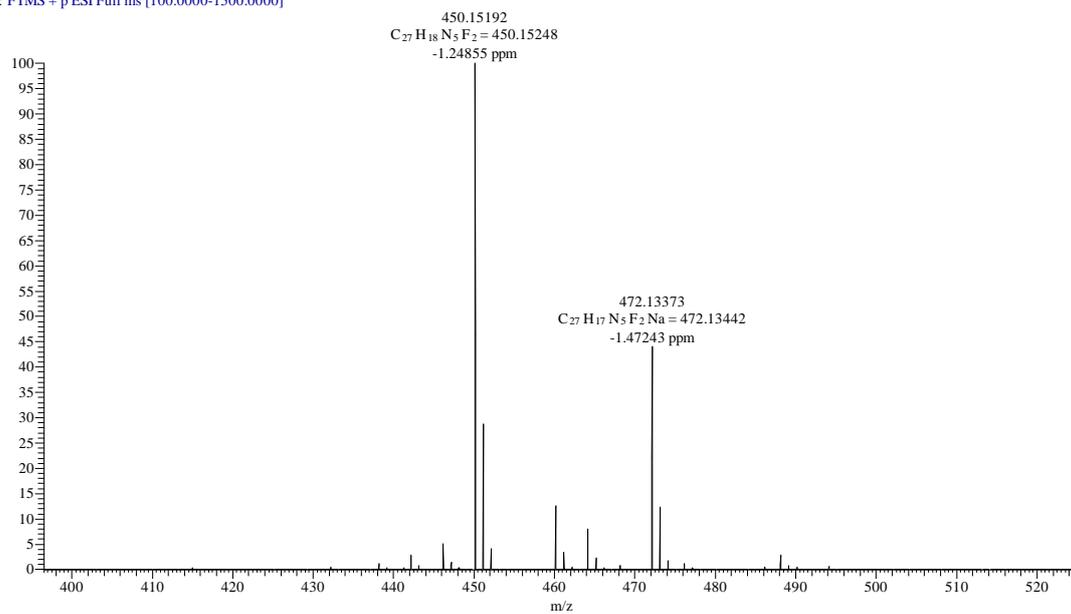


Spectra of compound **13c** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, <sup>19</sup>F NMR, HRMS)

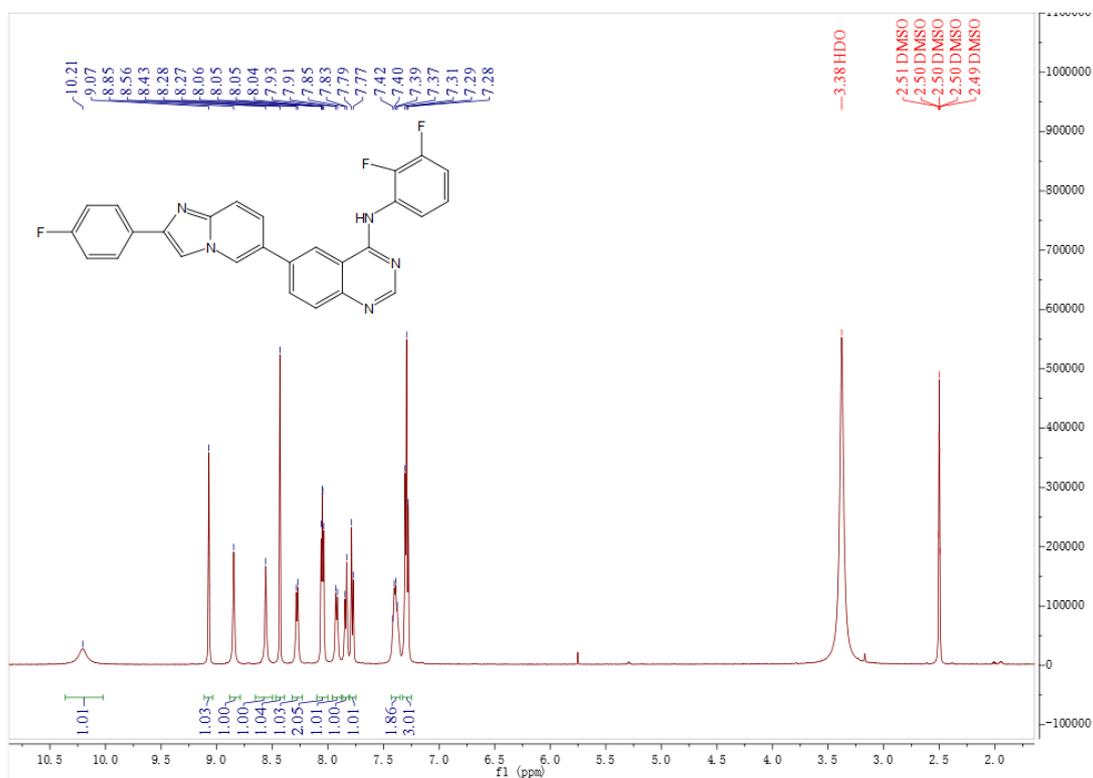


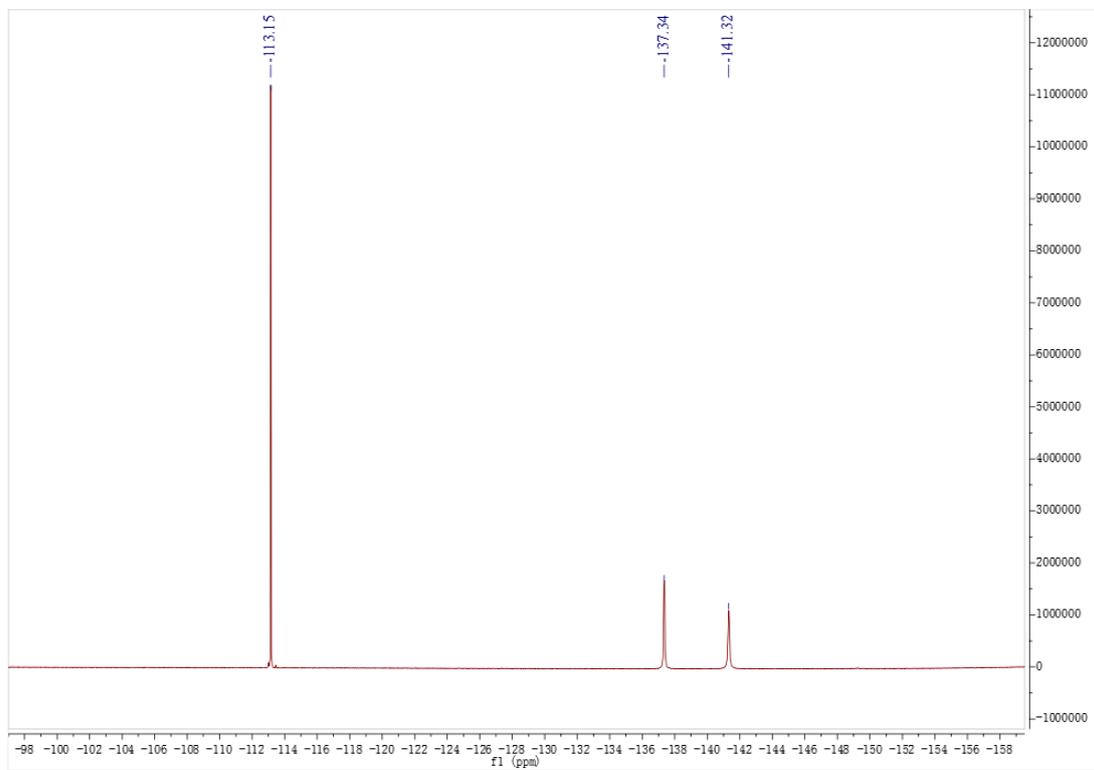
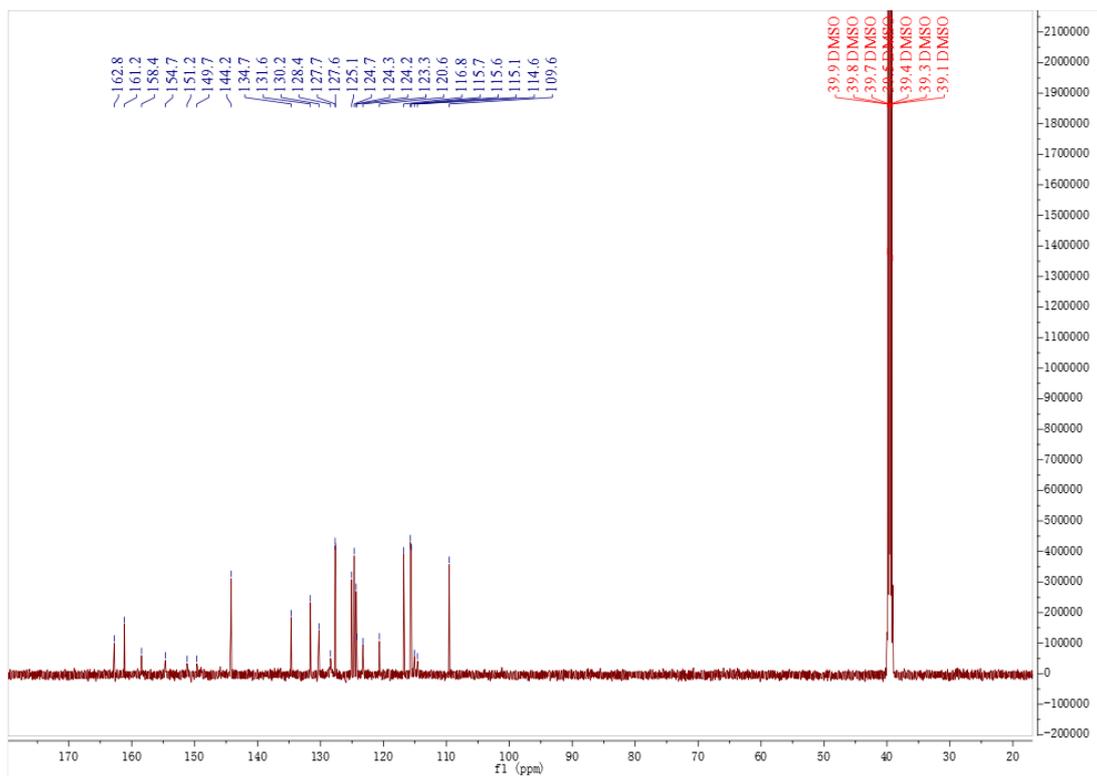


L3-74 #35 RT: 0.15 AV: 1 NL: 4.08E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

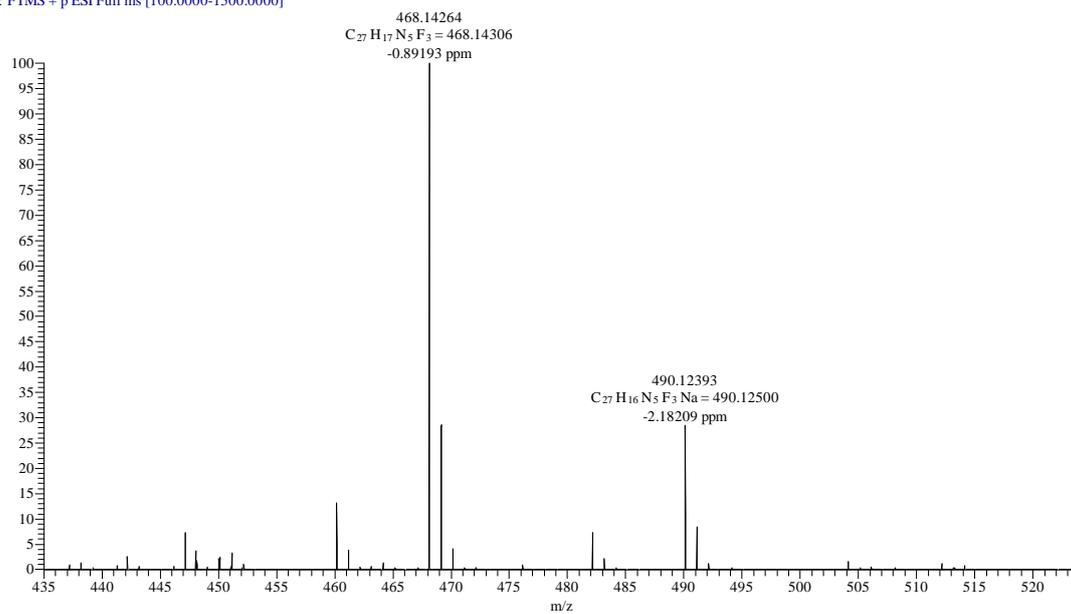


### Spectra of compound **13d** ( $^1H$ NMR, $^{13}C$ NMR, $^{19}F$ NMR, HRMS)

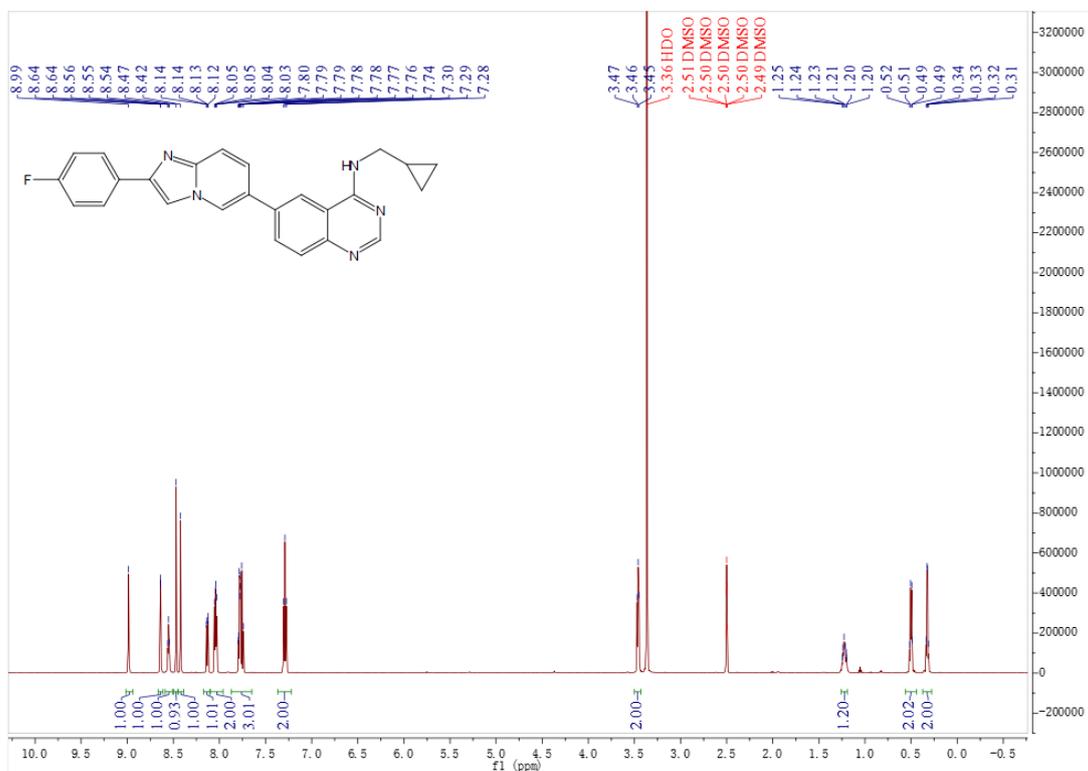


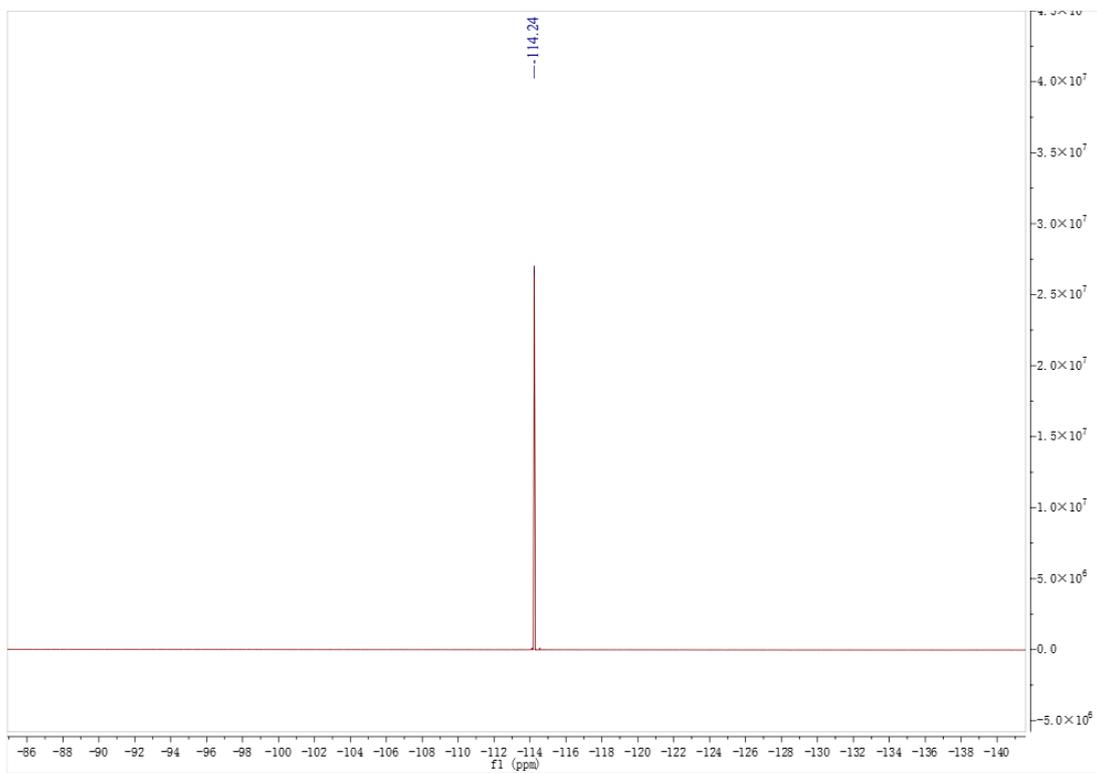
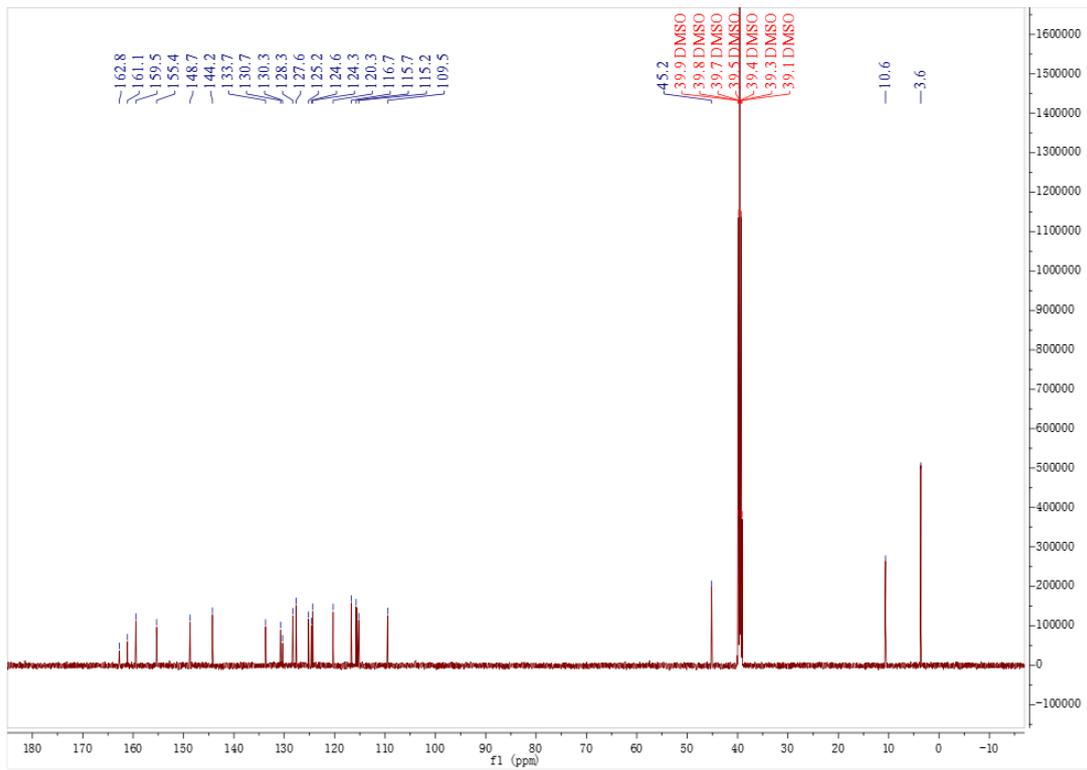


L3-75 #44 RT: 0.19 AV: 1 NL: 3.12E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

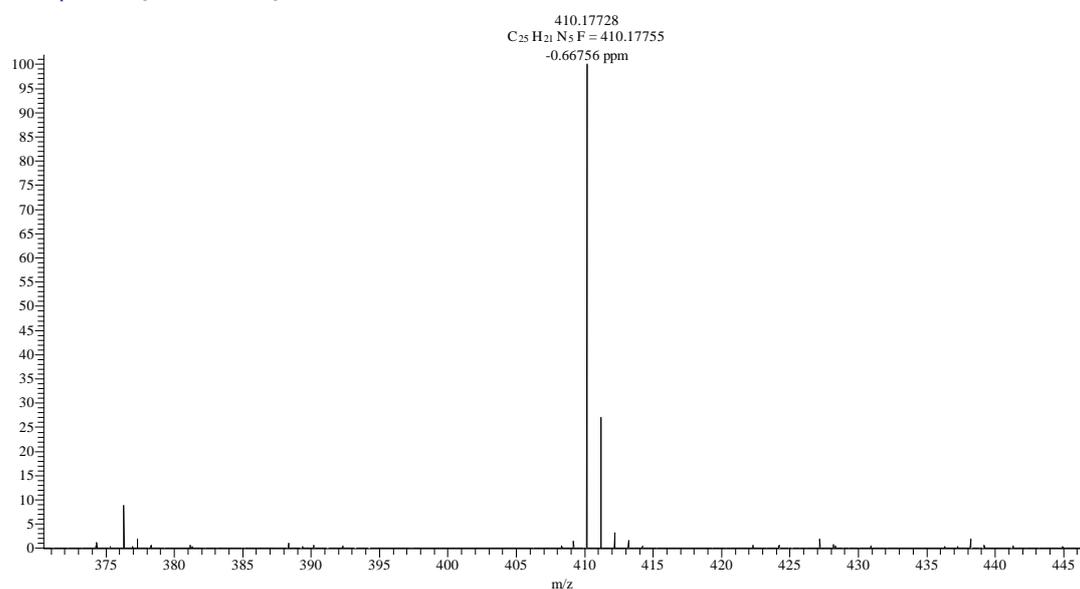


Spectra of compound **13e** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, <sup>19</sup>F NMR, HRMS)

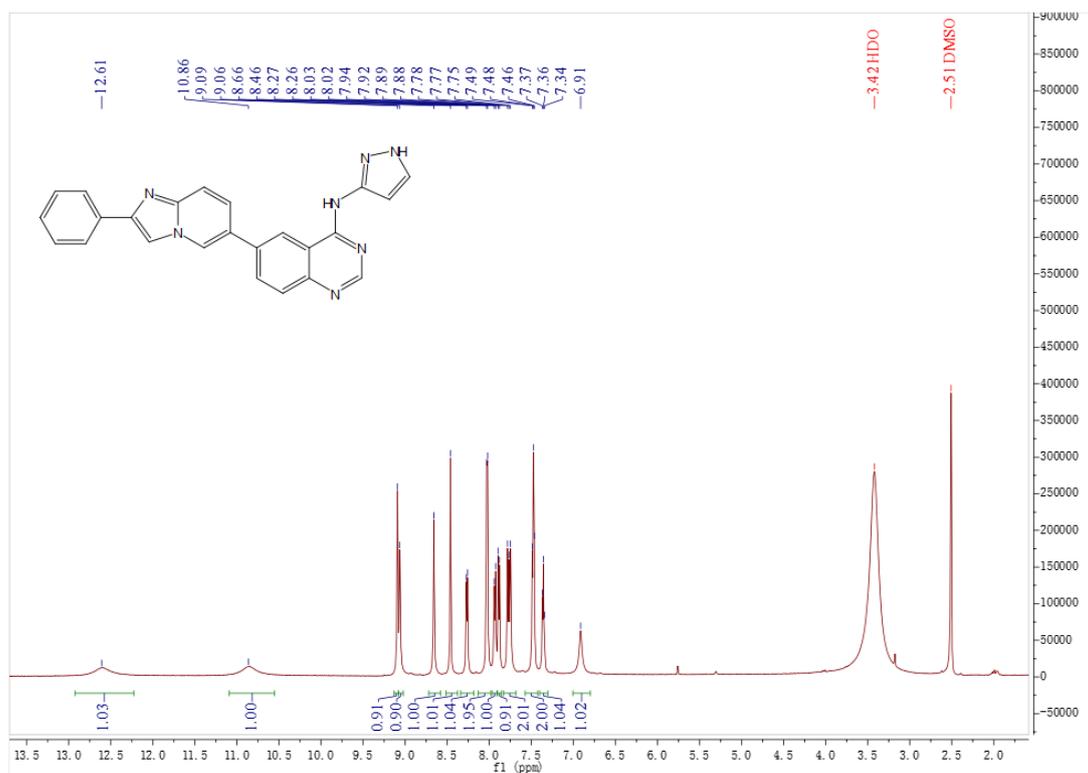


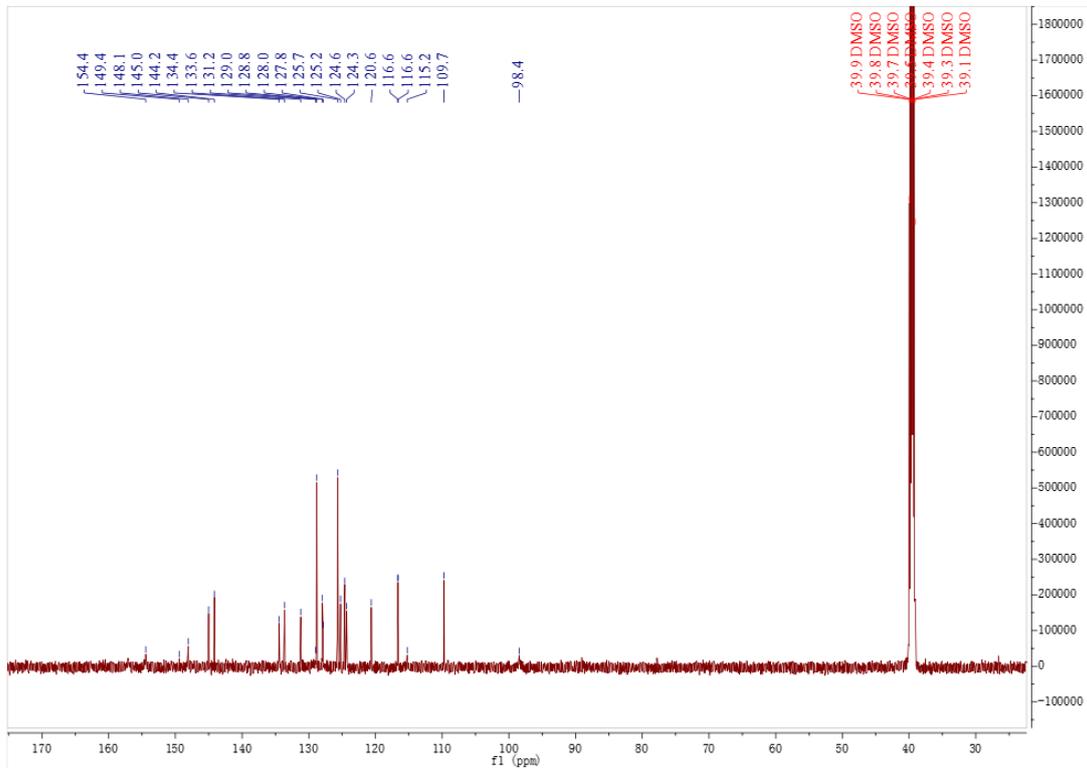


L3-80 #23 RT: 0.10 AV: 1 NL: 4.41E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

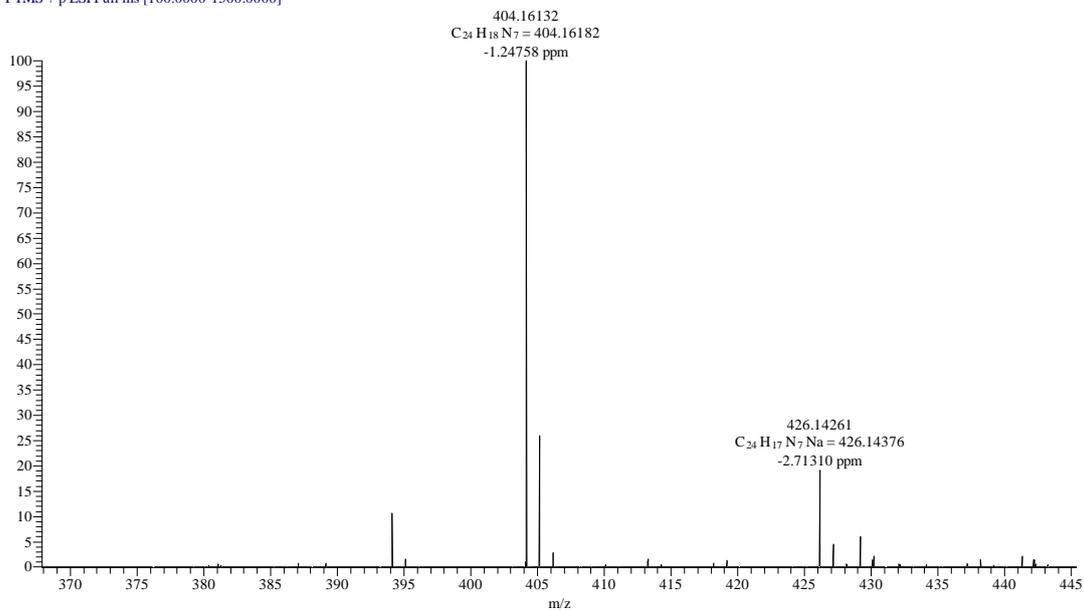


### Spectra of compound **13f** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, HRMS)

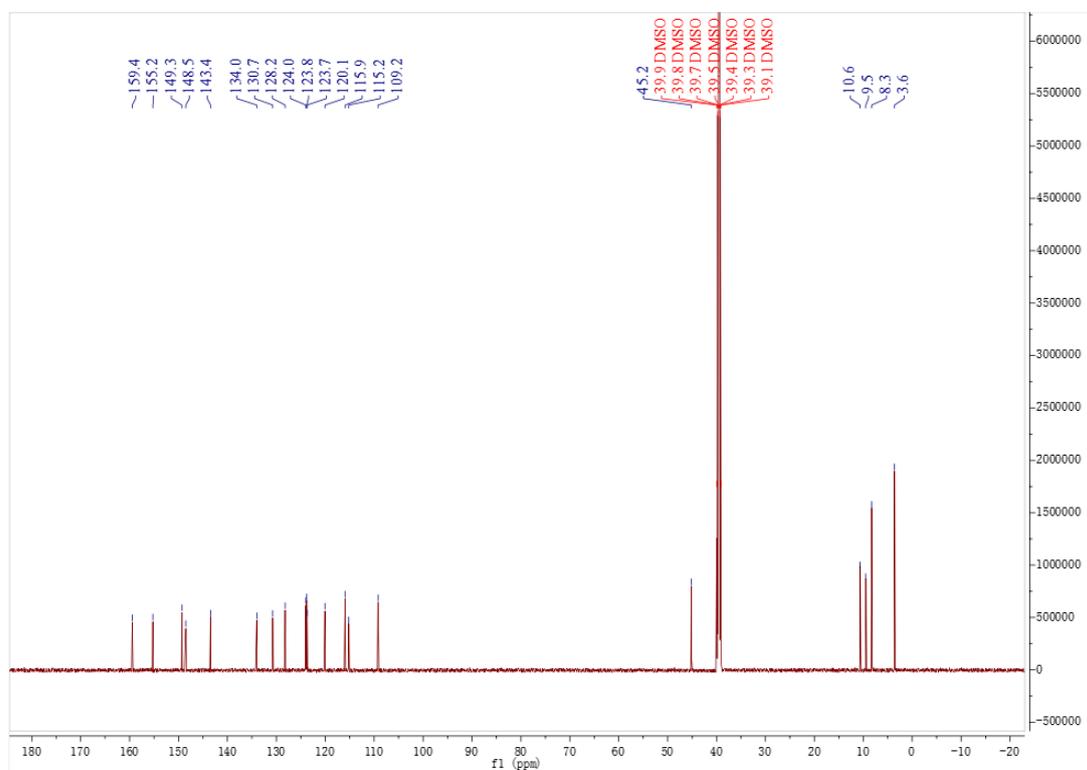
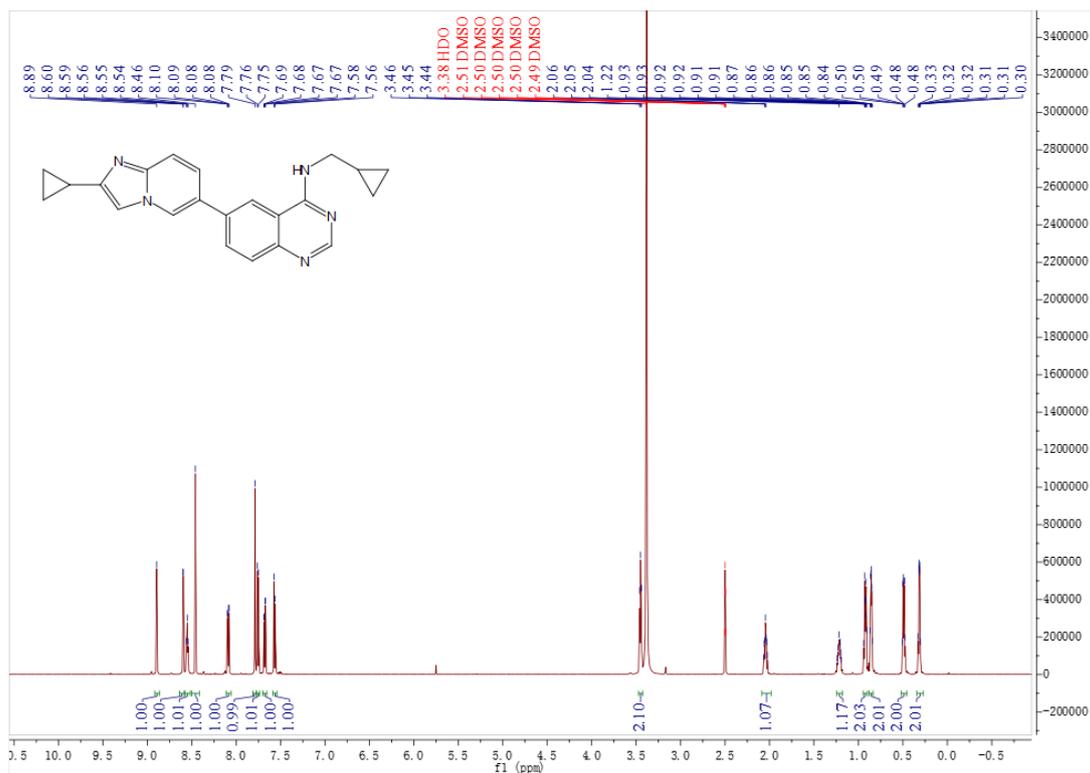




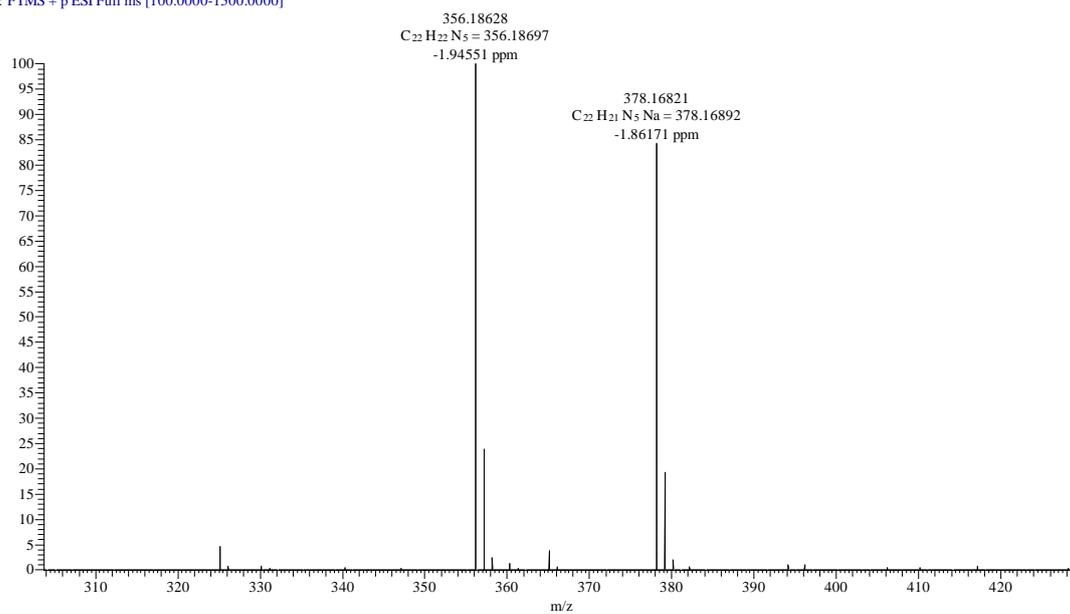
L3-81 #33 RT: 0.15 AV: 1 NL: 4.07E8  
 T: FTMS + p ESI Full ms [100.0000-1500.0000]



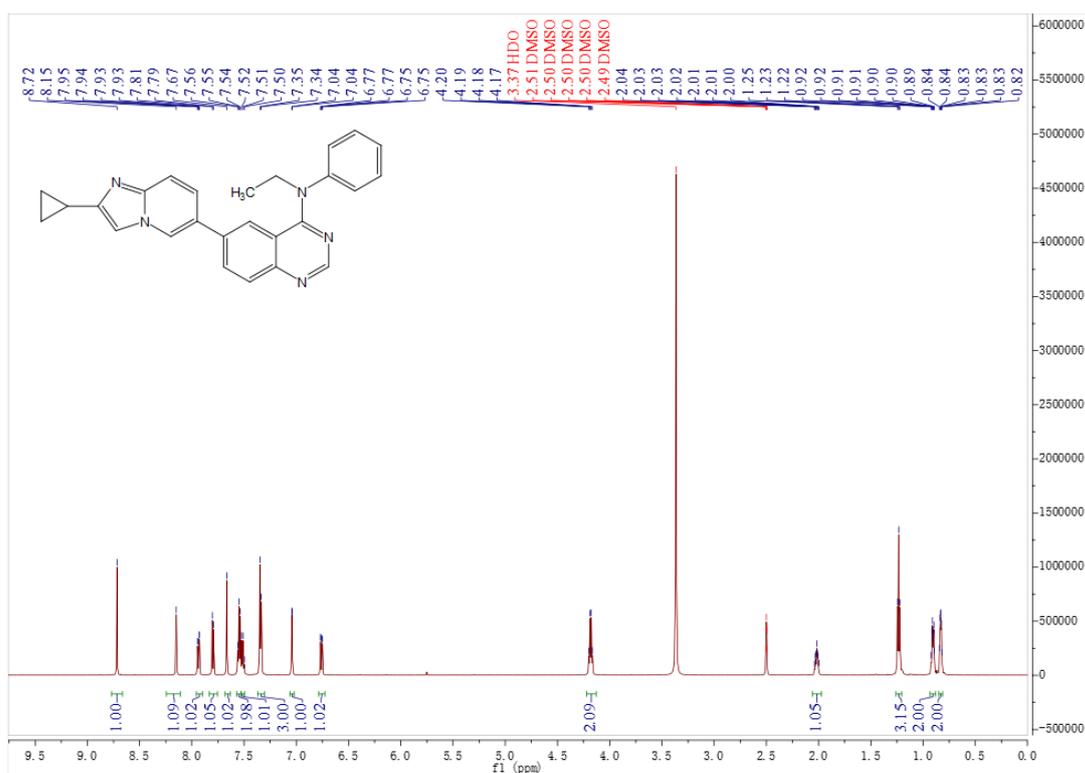
Spectra of compound **13g** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)

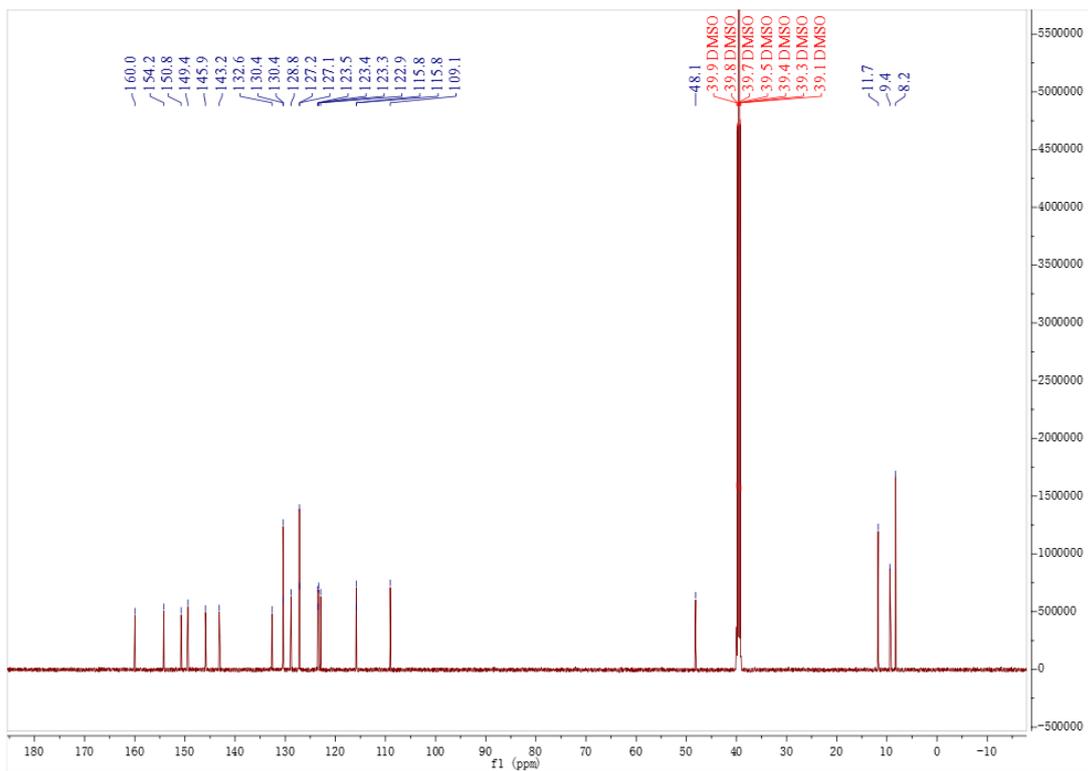


L3-82 #37 RT: 0.16 AV: 1 NL: 7.75E8  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

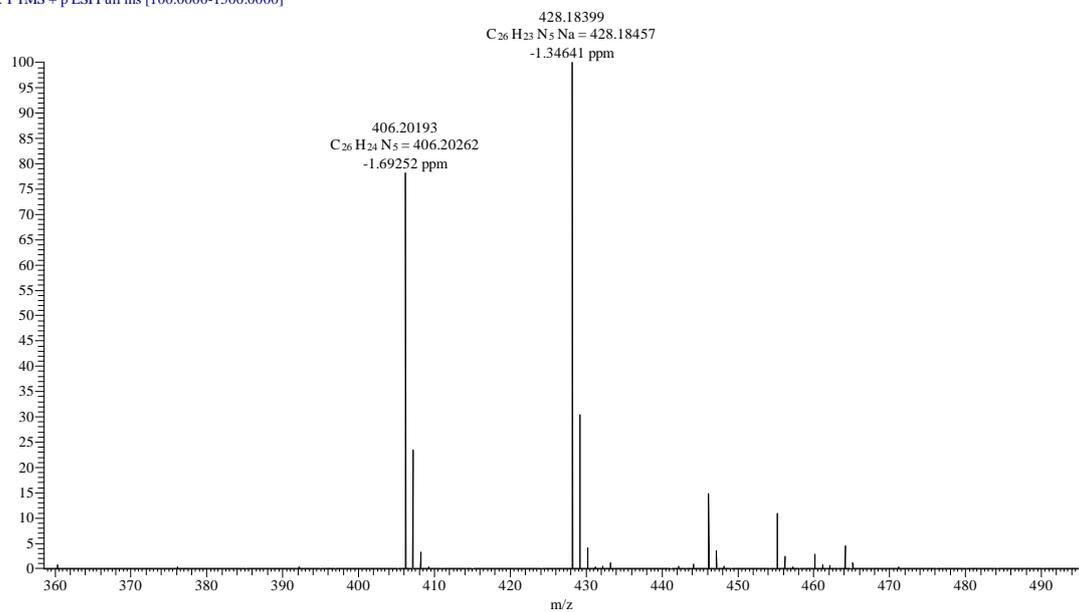


### Spectra of compound **13h** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, HRMS)

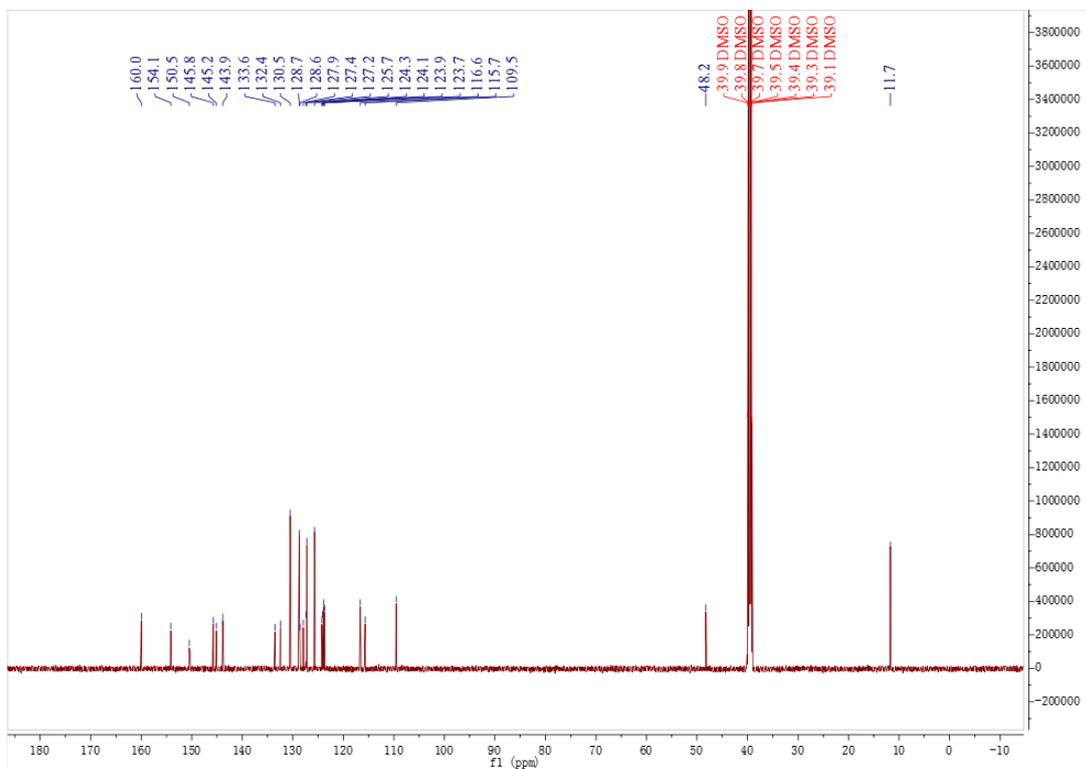
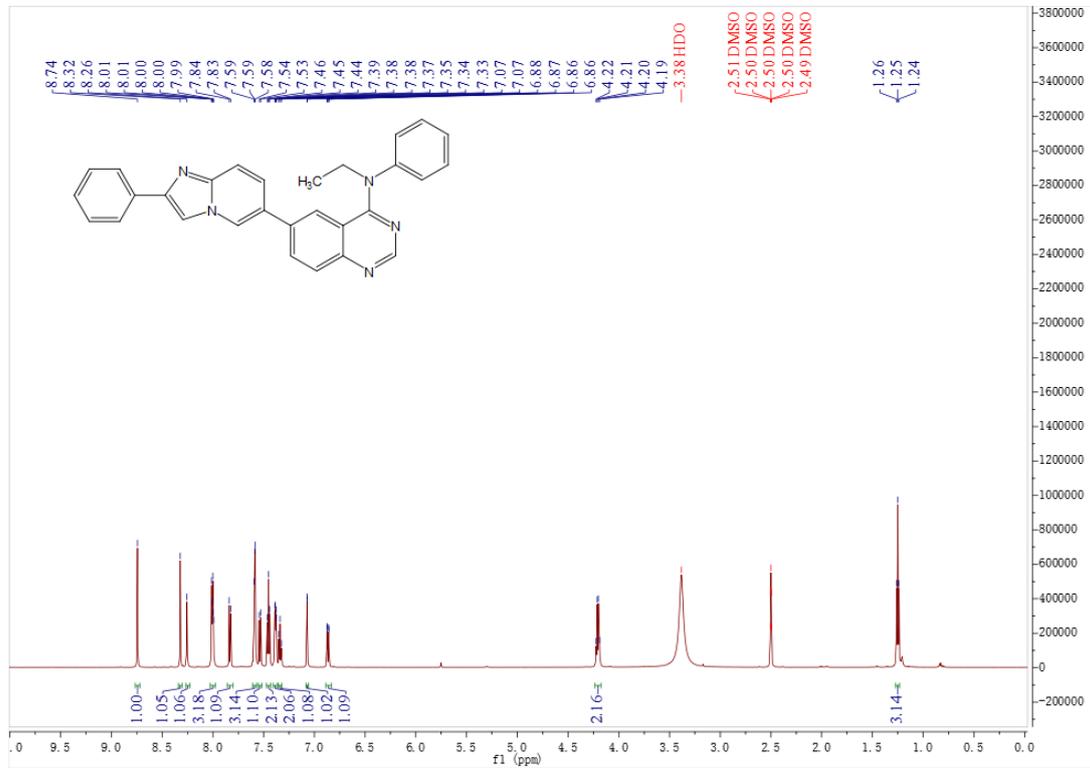




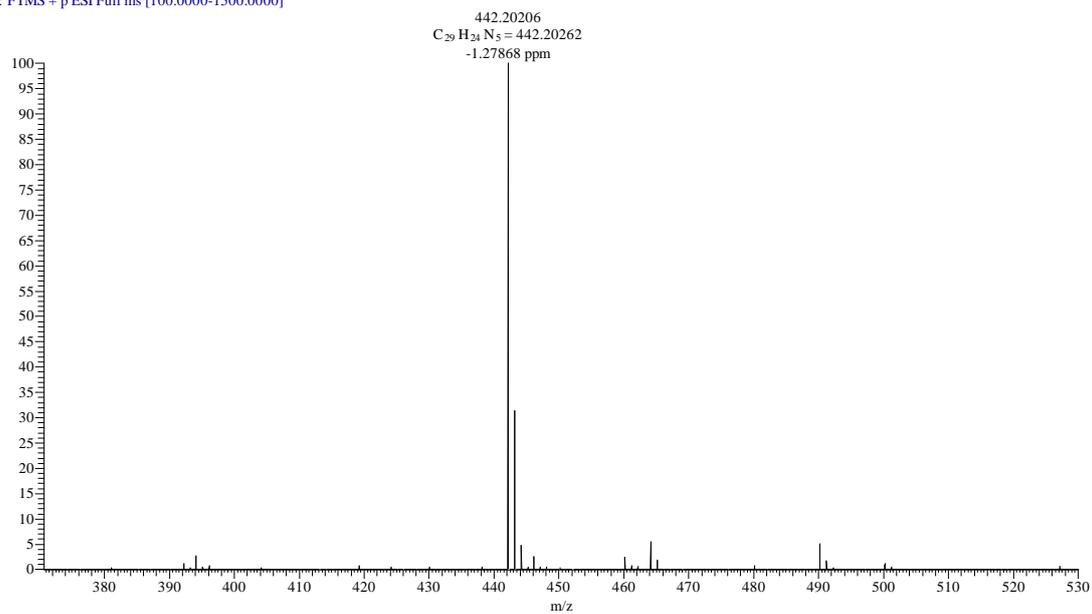
L3-84 #52 RT: 0.23 AV: 1 NL: 1.20E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]



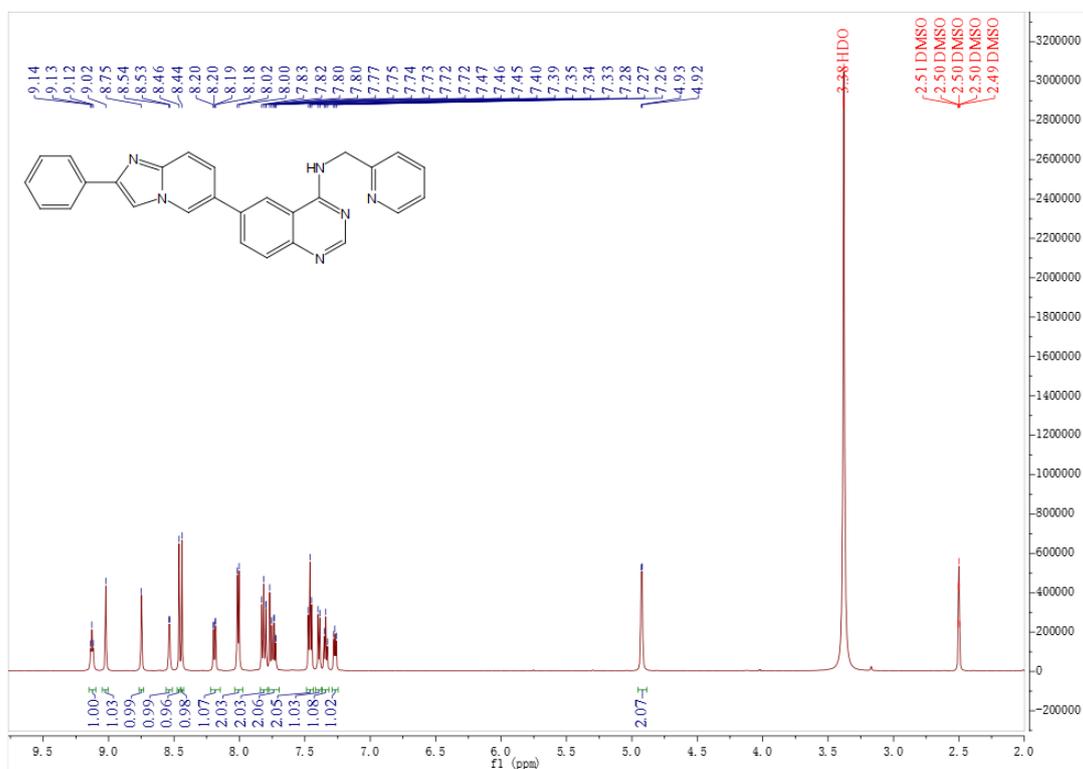
Spectra of compound **13i** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)

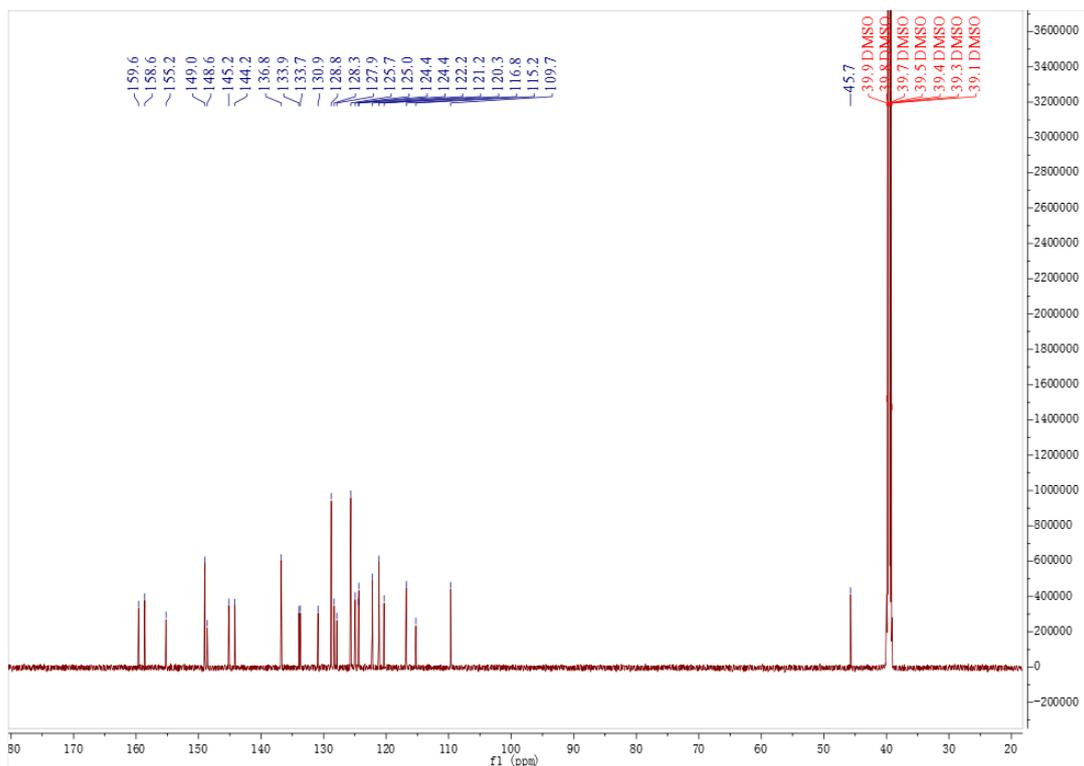


L3-86 #24 RT: 0.11 AV: 1 NL: 4.02E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

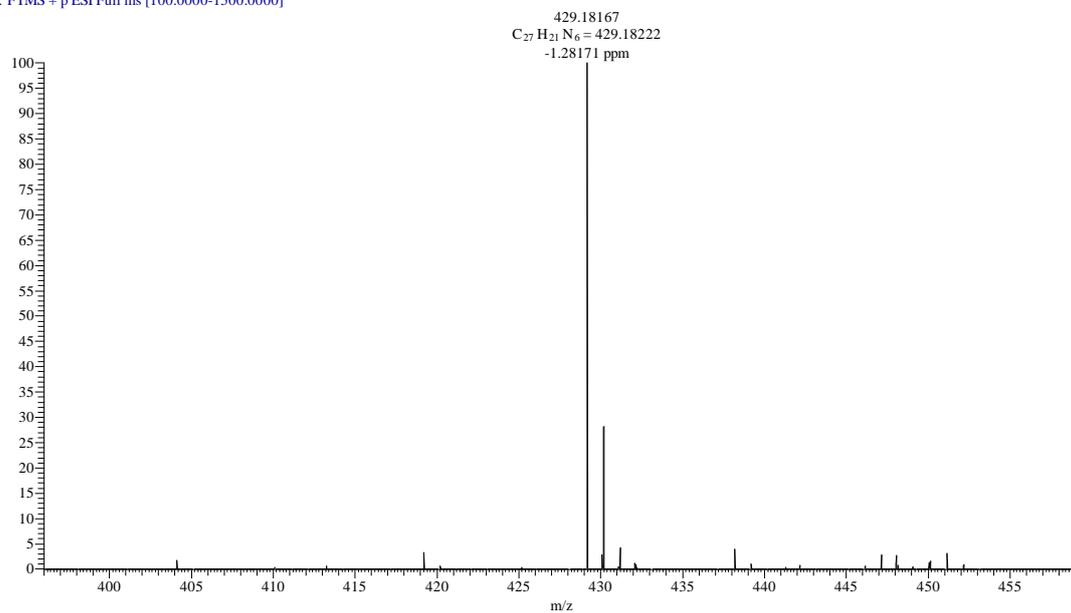


### Spectra of compound **13j** (<sup>1</sup>H NMR, <sup>13</sup>C NMR, HRMS)

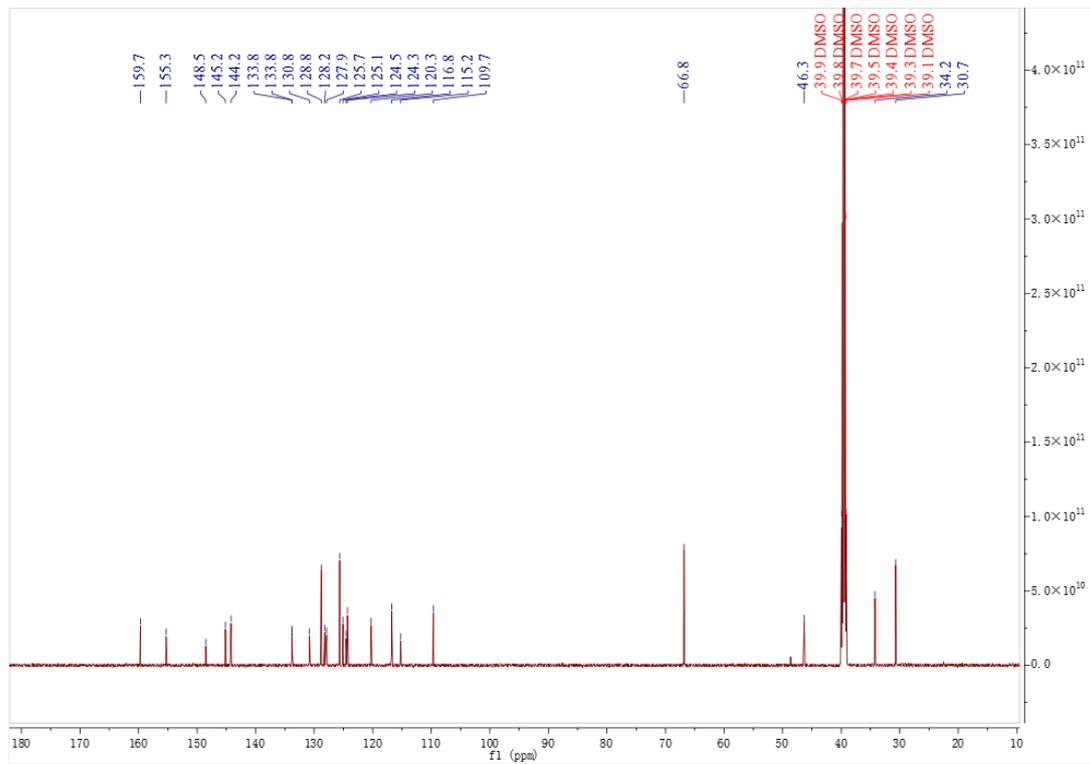
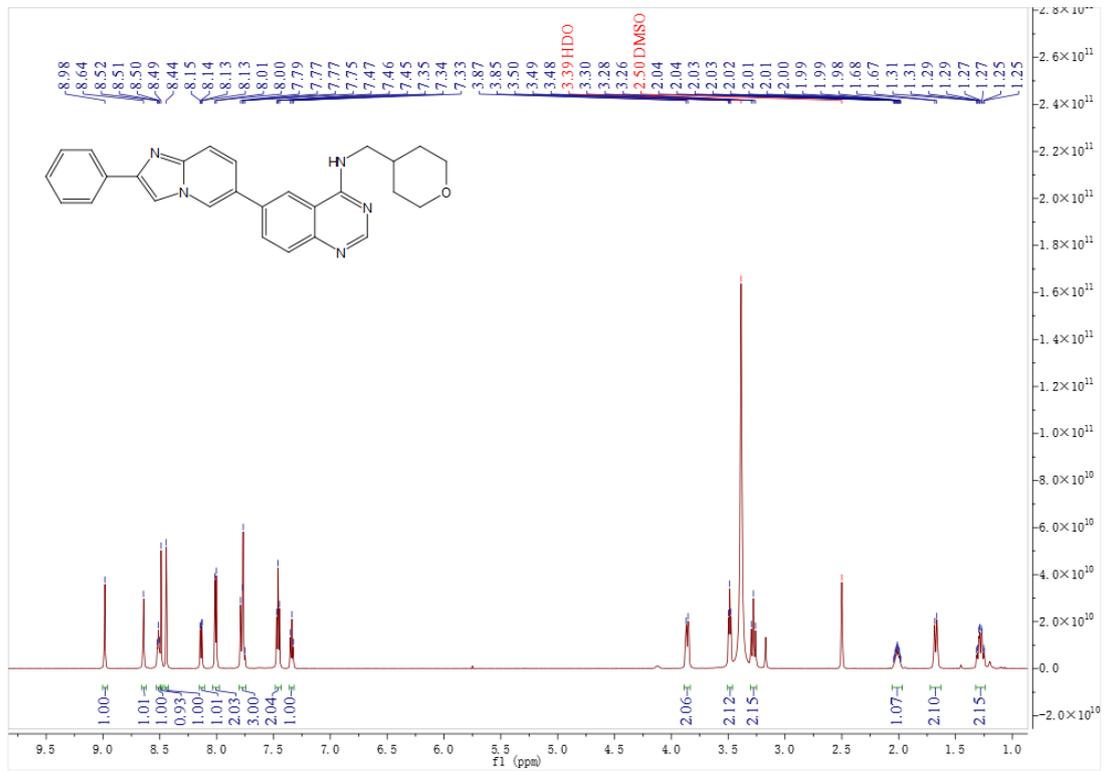




L3-87 #23 RT: 0.10 AV: 1 NL: 2.27E9  
 T: FTMS + p ESI Full ms [100.0000-1500.0000]



Spectra of compound **13k** ( $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, HRMS)



L3-88 #25 RT: 0.11 AV: 1 NL: 1.58E9  
T: FTMS + p ESI Full ms [100.0000-1500.0000]

