## **Supporting Information**

## Novel hexadeca-substituted metal free and zinc(II) phthalocyanines; Design, synthesis and photophysicochemical properties

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Figure S1. <sup>1</sup>H-NMR spectrum of compound **3** in CDCl<sub>3</sub>.



Figure S2. <sup>13</sup>C-NMR spectrum of compound **3** in CDCl<sub>3</sub>.



Figure S3.  $^{19}$ F-NMR spectrum of compound **3** in CDCl<sub>3</sub>.



Figure S4. MALDI-TOF spectrum of compound  $\mathbf{3}$  in CDCl<sub>3</sub>.



Figure S5. <sup>1</sup>H-NMR spectrum of compound **3a** in CDCl<sub>3</sub>.



Figure S6. <sup>1</sup>H-NMR spectrum of compound **3b** in CDCl<sub>3</sub>.



Figure S7. <sup>13</sup>C-NMR spectrum of compound **3a** in CDCl<sub>3</sub>.



Figure S8. <sup>13</sup>C-NMR spectrum of compound **3b** in CDCl<sub>3</sub>.



Figure S9. <sup>19</sup>F-NMR spectrum of compound **3a** in CDCl<sub>3</sub>.



Figure S10. <sup>19</sup>F-NMR spectrum of compound 3b in CDCl<sub>3</sub>.



Figure S11. MALDI-TOF spectrum of compound 3a in CDCl<sub>3</sub>.



Figure S12. MALDI-TOF spectrum of compound **3b** in CDCl<sub>3</sub>



**Figure S13.** UV–vis spectra of a) **3a** and b) **3b** in DMF at different concentration (C= $2-12\mu$ M).



**Figure S14.** Fluorescence emission spectra of a) phthalocyanine **3a** and b) phthalocyanine **3b** in DMF at  $5 \times 10^{-6}$  M. (Excitation wavelength= 686 nm for **3a** and 700 nm for **3b**).



**Figure S15.** Time correlated single photon counting (TCSPC) trace for a) **3a** (Excitation wavelength=686 nm) and b) **3b** (Excitation wavelength=700 nm) in DMF with residuals.



**Figure S16.** The electronic absorption spectral changes during the determination of singlet oxygen quantum yields. This determination was for **3a** in DMF at a concentration of  $1 \times 10^{-5}$  M. (Inset: Plot of DPBF absorbances versus time).



**Figure S17.** The electronic absorption spectral changes of **3a** in DMF under light irradiation showing the disappearance of the Q-band (Inset: plot of phthalocyanine absorbances versus time).



**Figure S18.** Fluorescence emission spectral changes of **3a**  $(1 \times 10^{-5} \text{M})$  by the addition of different concentrations of BQ in DMF