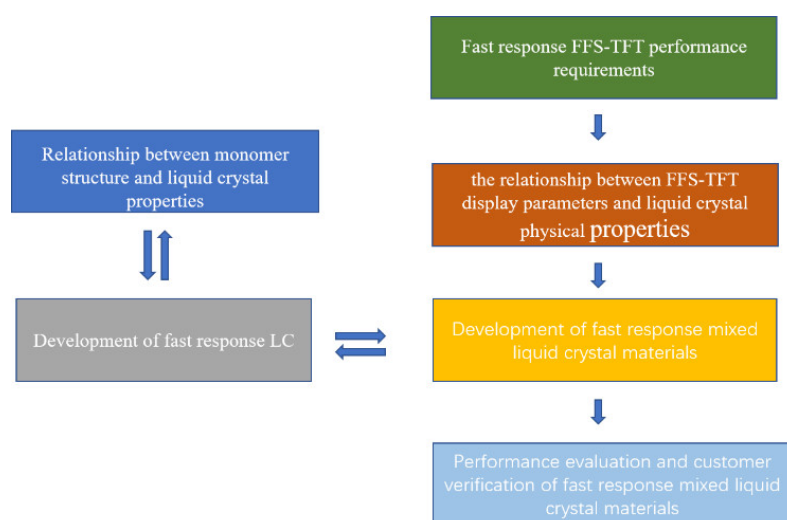


# Support Information

## Research of Liquid-Crystal Materials for a High-Performance FFS-TFT Display

Haiguang Chen <sup>1,2,3</sup>, Youran Liu <sup>2,3</sup>, Maoxian Chen <sup>2,3</sup>, Tianmeng Jiang <sup>2,3</sup>, Lanying Zhang <sup>4</sup>, Zhou Yang <sup>1,\*</sup> and Huai Yang <sup>4,\*</sup>

- <sup>1</sup> School of Materials Science and Engineering, University of Science and Technology Beijing, Beijing 100083, China  
<sup>2</sup> Beijing Bayi Space Liquid Crystal Material Technology Company, Yangfang 102200, China  
<sup>3</sup> Beijing Key Laboratory of Liquid Crystal Materials Analysis and Application Technology, Beijing 102502, China  
<sup>4</sup> School of Materials Science and Engineering, Peking University, Beijing 100871, China  
\* Correspondence: yangz@ustb.edu.cn (Z.Y.); yanghuai@pku.edu.cn (H.Y.); Tel.: +86-01062333759 (Z.Y.); +86-010-62766919 (H.Y.)



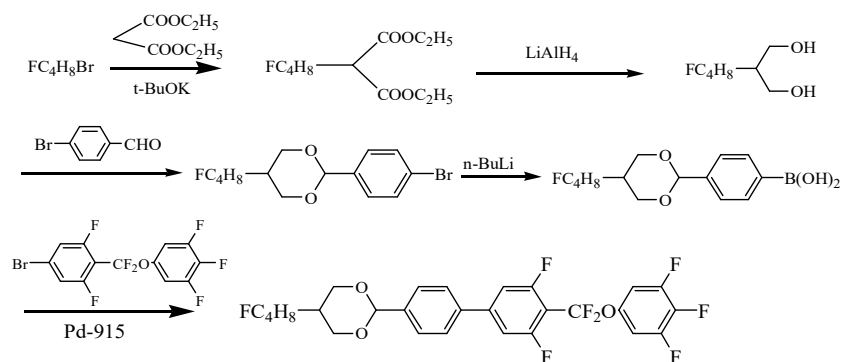
**Figure S1.** Technology Roadmap.

**Table S1.** Spec of Quality

Liquid Crystal Property		Spec
Specific Resistivity [25°C]	$\rho[\Omega\cdot\text{cm}]$	$\geq 1\times 10^{13}$
Specific Resistivity [25°C] After Heat 120°C, 2h	$\rho[\Omega\cdot\text{cm}]$	$\geq 1\times 10^{12}$
Resistivity [25°C] After UV 10000mW/cm <sup>2</sup>	$\rho[\Omega\cdot\text{cm}]$	$\geq 1\times 10^{12}$
VHR [1V, 2s, 60°C]	(%)	$\geq 98.5\%$
VHR [1V, 2s, 60°C] After UV 10000mW/cm <sup>2</sup>	(%)	$\geq 98\%$
Ion Density [1V, 0.01Hz, 60°C]	PC	$\leq 50$
Ion Density [1V, 0.01Hz, 60°C] After UV 10000mW/cm <sup>2</sup>	PC	$\leq 100$
Metallic ion	PPb	$\leq 20$

**Table S2.** Relationship between Structures and Performances of Liquid Crystal.

Physical parameters	Adjustment	Monomer structure
$\Delta\epsilon$	$\uparrow$	Dioxane, Linking group
	$\downarrow$	Nonpolar terminal
$\Delta n$	$\uparrow$	Increase number of rings, Phenyl
	$\downarrow$	Cyclohexane, Dioxane
$T_{S-N}$	$\uparrow$	Linking group, F substitution
	$\downarrow$	Polycyclic
$C_p$	$\uparrow$	Cyclohexane, Polycyclic, Long carbon chain
	$\downarrow$	Phenyl
$\gamma_1$	$\uparrow$	Cyclohexane, Long carbon chain
	$\downarrow$	Phenyl, Dioxane, Alkenyl linking group
K11	$\uparrow$	Cyclohexane, Polycyclic
	$\downarrow$	Phenyl
K22	$\uparrow$	Cyclohexane, Polycyclic
	$\downarrow$	Phenyl
K33	$\uparrow$	Cyclohexane, Polycyclic, Alkenyl
	$\downarrow$	Phenyl



**Figure S2.** The synthesized route of the TFT liquid crystal compound.

**Table S3.** The contents of some metallic Ions

	BHR95300		
Na	0	Ni	0
Mg	0.02	Cu	0.69
Al	0.02	Zn	0
K	0.13	Sr	0
Mn	0	Pd	0
Fe	0	Sn	0.09
Co	0	Total	0.95