# Thienothiophene Based Quantum Dots; Calibration of Photophysical Properties via Carbon Dot and Biomolecular Interactions

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## **Index of Content**

1.	General and Instrumentation	-S2
2.	Optical properties	-S3
3.	FTIR collection	-S4
4.	NMR collection	-S4
5.	Mass collection	-S5

#### 1. General and Instrumentation

All the reagents, purchased from Aldrich and Acros, were used without further purification. The solvents used in the syntheses were technical grade and freshly distilled prior to use. The solvents used in spectroscopic measurements were spectroscopic grade. Flash chromatography was performed using  $\leq 0.063 \ \mu m$  Silica.

#### NMR spectroscopy

<sup>1</sup>H NMR spectra were recorded on a Varian 500 spectrometer. Proton chemical shifts were reported in parts per million downfield from tetramethyl silane, TMS.

#### **Optical spectroscopy**

Fluorescence spectra were recorded on a HITACHI F-4500 fluorescence spectrophotometer. UV-Vis measurements were recorded on a HITACHI U-0080D spectrophotometer. Solid-state and in solution quantum yields were measured using Hamamatsu Quantaurus-QY Absolute PL Quantum Yield Spectrometer.

#### Mass spectrometry

Mass spectra were recorded on Thermo LCQ-Deca ion trap mass instruments.

## FTIR spectroscopy

Fourier transform infrared spectroscopy (FTIR) were recorded on Thermo LCQ-Deca ion trap mass instruments.

# 2. Optical Properties



Fig. S1. Absorption spectra of TT-TPE-TPA in solvents by varying polarity.

Table S1.	UV-visible absorption and	d fluorescence	properties of	TT-TPE-TPA	in different
solvents.					

		ТТ-ТРЕ-ТРА		
Solvent	Δf <sup>a</sup>	λ <sub>abs, max</sub> b (nm)	λ <sub>em, max</sub> c (nm)	Δv <sup>d</sup> (cm <sup>-1</sup> )
Hexane	0.0012	384	534	7228
Toluene	0.01	392	547	7315
Chlorobenzene	0.14	395	557	7363
Dichlorometane	0.22	392	563	7748
Chloroform	0.19	391	556	7589
Acetone	0.28	391	567	7938
Acetonitrile	0.30	390	576	8298
DMF	0.28	392	581	8279
DMSO	0.29	392	585	8416

<sup>a</sup> Orientation polarizability value.

b Maximum absorption wavelength (nm),

c Maximum absorption wavelength (nm),  $d\Delta v = 1/\lambda_{max} - 1/\lambda_{em}$ .

# 3. FTIR Collection



Fig. S2. FTIR spectra of CN CD and CNB CD.

# 4. NMR Collection



Fig. S3. <sup>1</sup>H NMR spectra of TT-TPE-TPA





## 5. Mass Collection



Fig. S5. Mass spectra of TT-TPE-TPA.