Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Efficient Dye-Sensitized Solar Cells with Broad Absorption and Enhanced Photo-current Generation

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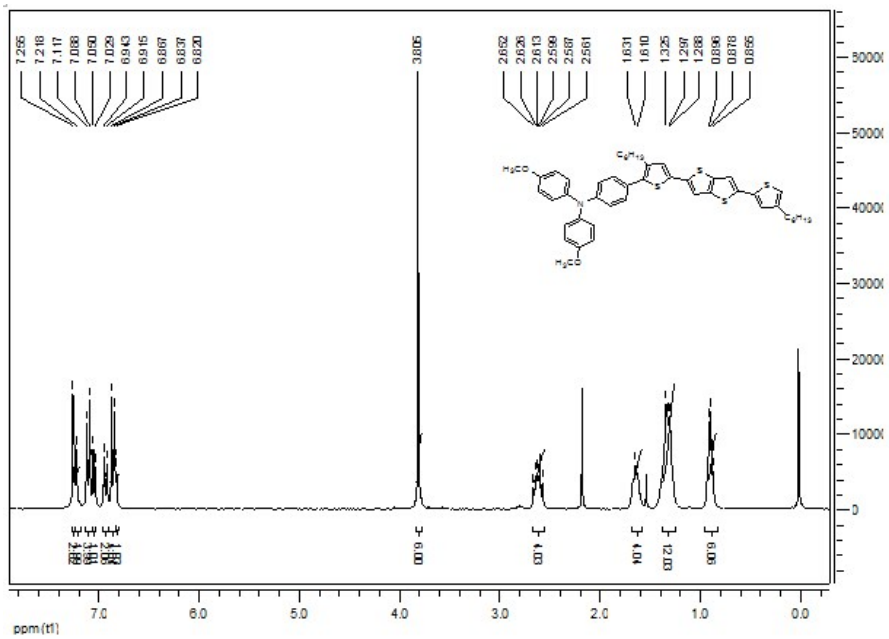
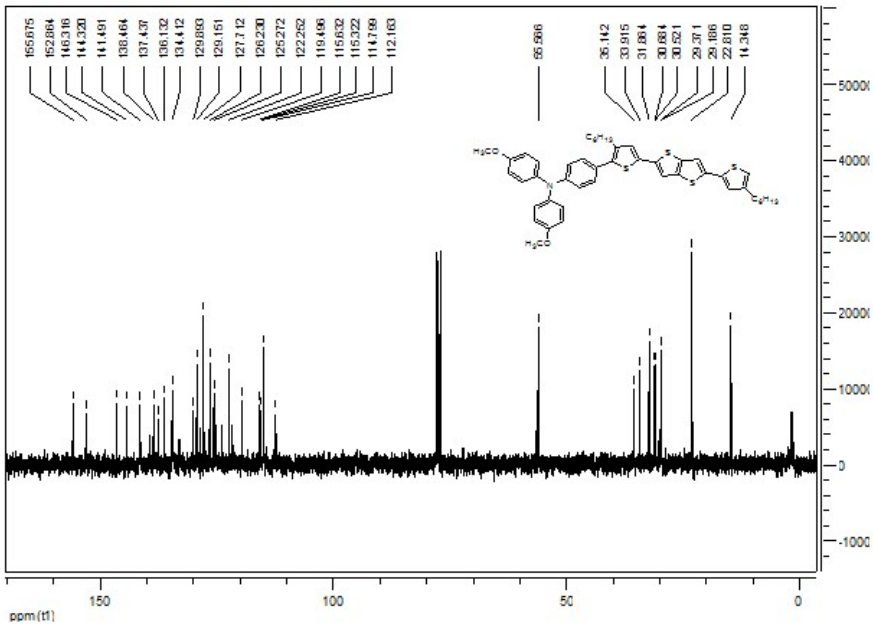
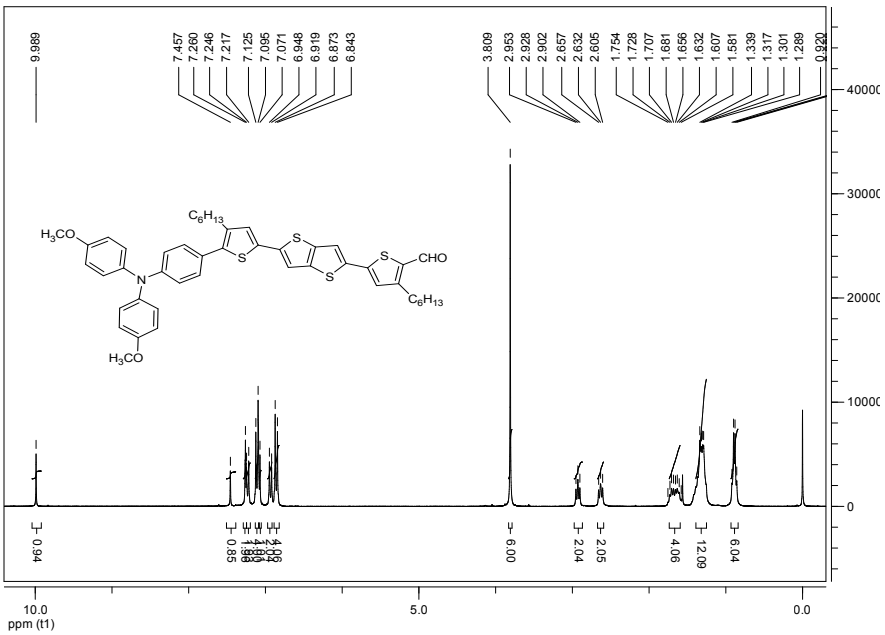
SI 1. *NMR spectroscpoy of compounds (7),(8), and (9)*

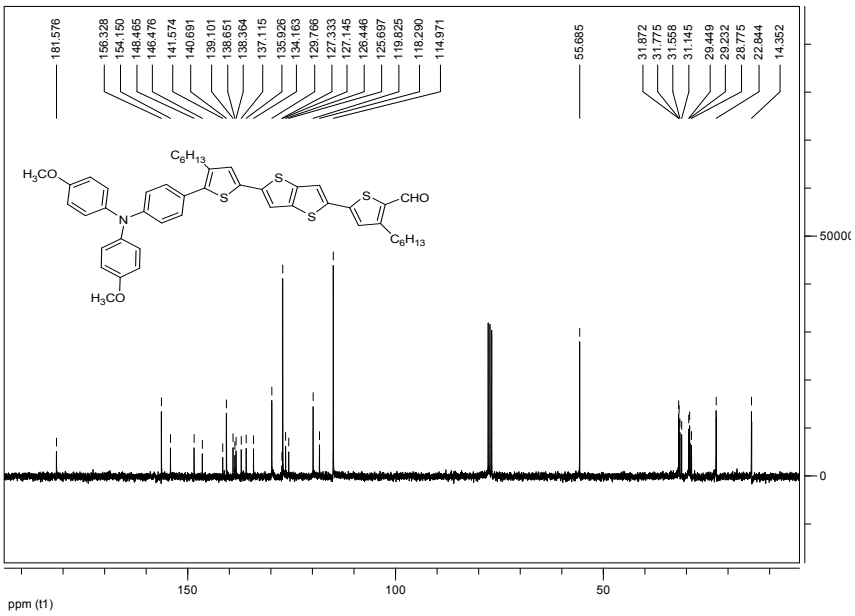
4-(3-hexyl-5-(5-(4-hexylthiophen-2-yl)thieno[3,2-b]thiophen-2-yl)thiophen-2-yl)-N,N-bis(4-methoxyphenyl)aniline (7)



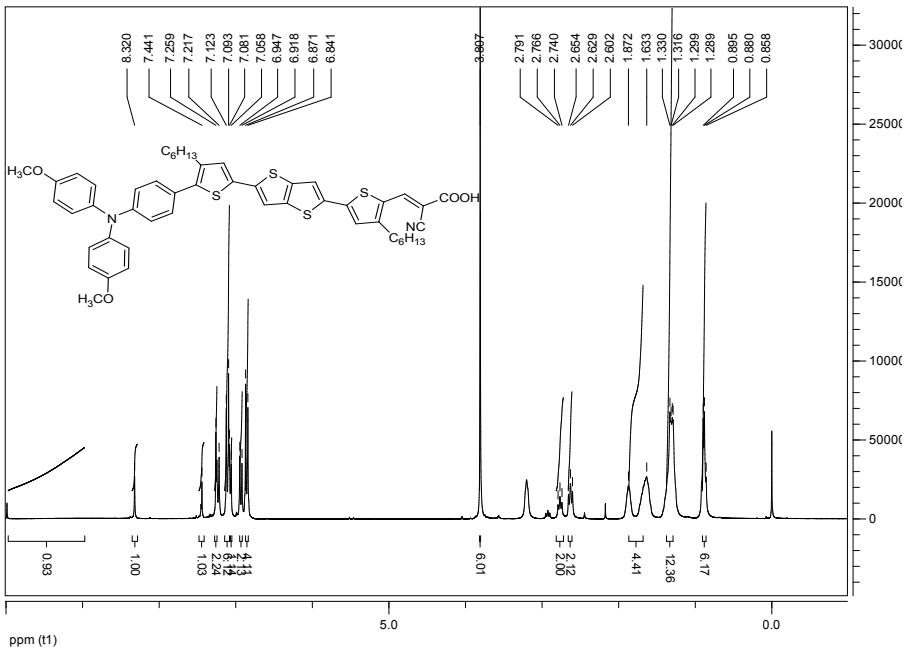


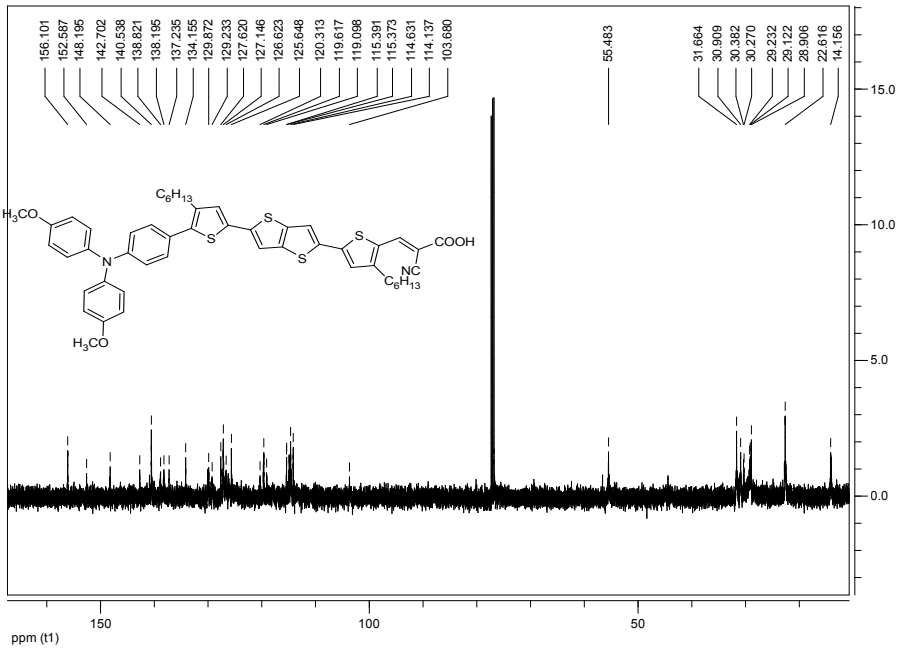
5-(5-(5-(4-(bis(4-methoxyphenyl)amino)phenyl)-4-hexylthiophen-2-yl)thieno[3,2-b]thiophen-2-yl)-3-hexylthiophene-2-carbaldehyde (8)



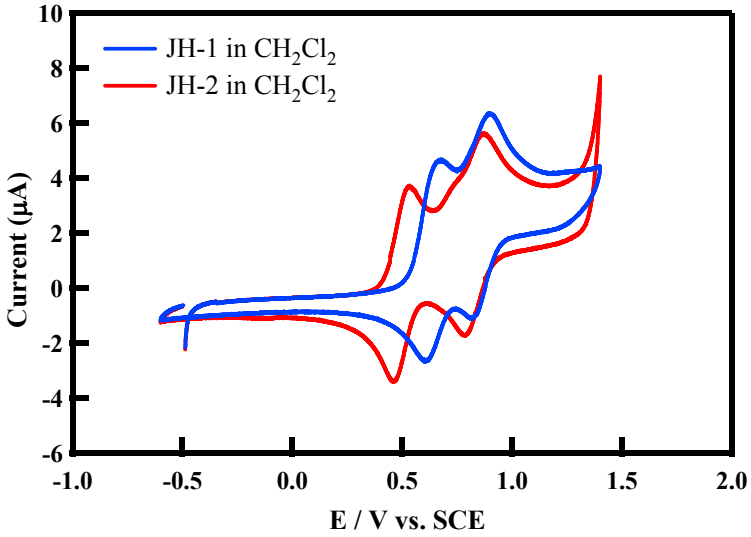


3-(5-(5-(5-(4-(bis(4-methoxyphenyl)amino)phenyl)-4-hexylthiophen-2-yl)thieno[3,2-b]thiophen-2-yl)-3-hexylthiophen-2-yl)-2-cyanoacrylic acid (9)



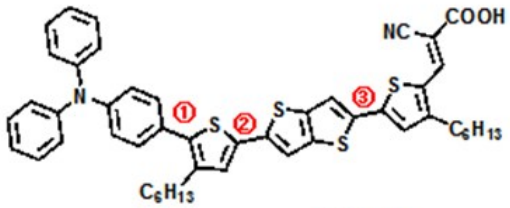


SI 2. Cyclic voltammogram



Cyclic voltammogram of JH-1 (from ref. [15]) and JH-2 sensitizers measured at a scan rate of 100 mV/s.

SI 3. ***Molecules configuration and orientation***

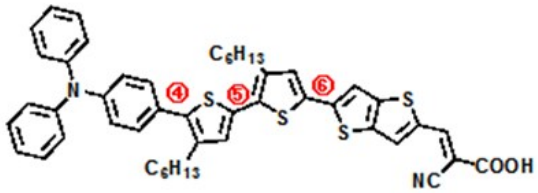


① : -45.9462

② : 24.4644

③ : -5.0241

[JH-1]

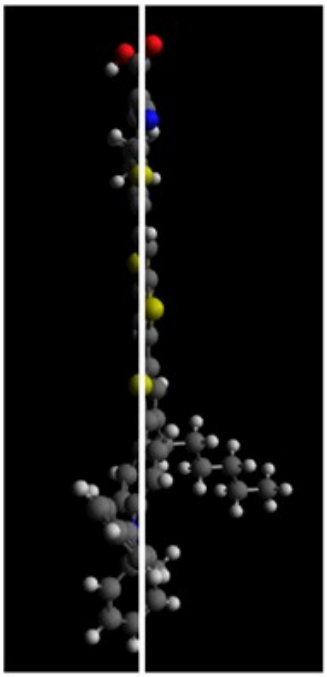


④ : -48.3126

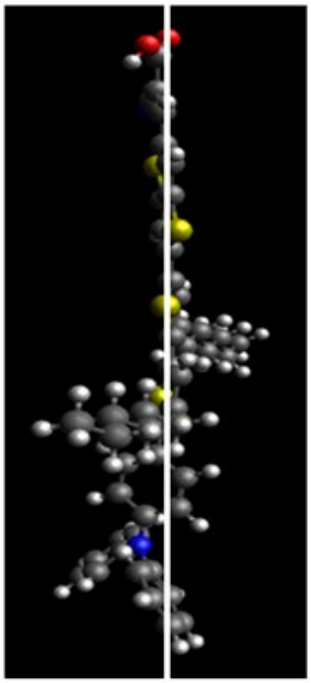
⑤ : -25.2148

⑥ : 19.1834

[PTD-02]

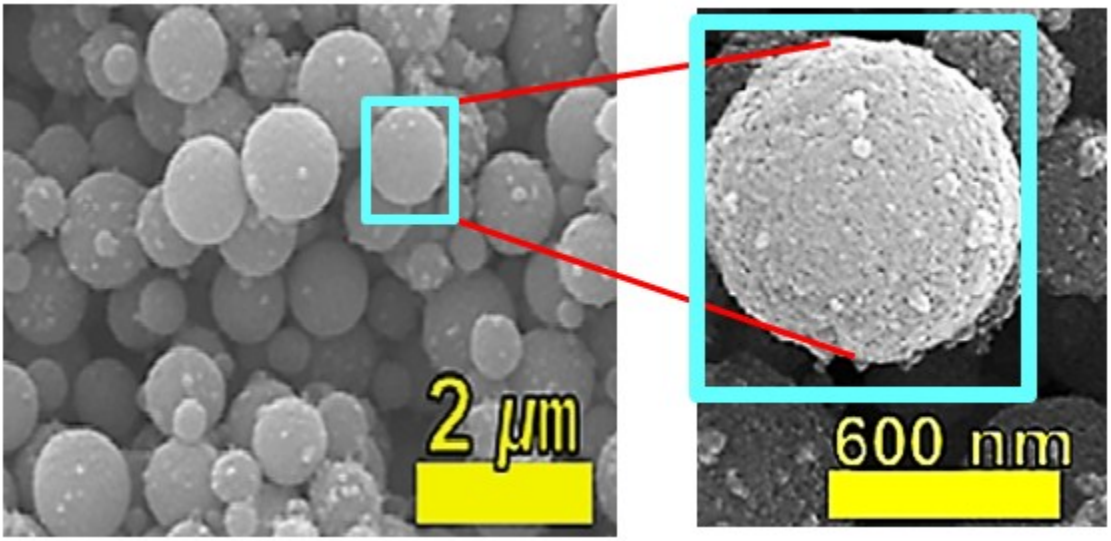


[JH-1]



[PTD-02]

SI 4. Scanning Electron Microscopy images of hierarchically structured (HS-) photoelectrodes (left) and its enlarged picture showing the nanocrystalline (nc-) TiO2 aggregate (right)(See ref.18 for the details of HS-TiO_2 photoelectrode preparation)



SI 5. Schematic figure showing the size effect of HS TiO_2 and nanocrystalline(nc-) TiO_2 photoelectrodes.