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Intra-molecular locked dithio alkylbithiophene-based semiconductors for high performance organic field effect transistors

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New 3,3'-dithioalkyl-2,2'-bithiophene (SBT) based small molecular and polymeric semiconductors are synthesized by end-capping or co-polymerization with dithienothiophen-2-yl (DTT) units. Single crystal, molecular orbital computations and optical/electrochemical data indicate that the SBT core is completely planar likely via S(alkyl)··S(thiophene) intra-molecular locks. Therefore, compared to semiconductors based on the conventional 3,3'-dialkyl-2,2'-bithiophene (BT), the resulting SBT systems are planar (torsional angle <1°) and highly π-conjugated. Charge transport characteristics were investigated for solution-sheared films in field-effect transistors demonstrating that SBT can enable good semiconducting materials with whole mobilities ranging from ~0.03 to 1.7 $cm^2 V^{-1} s^{-1}$. Transport difference within this family was rationalized by film morphology as accessed by grazing incidence X-ray diffraction (GIXRD) experiments.

Biography

Sureshraju Vegiraju has expertise in synthetic organic chemistry. He has received his PhD in Chemistry at National Central University, Taiwan (2015) on "Synthesis and characterization of fused thiophenes and diketopyrrolopyrroles containing conjugated small molecules". He is continuing as a Postdoctoral Researcher and he has developed conjugated organic small molecules and polymers for the applications in organic electronics. He has published more than 20 papers in reputed journals.

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