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Thienoisatin Oligomers as N-Type Molecular Semiconductors

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ABSTRACT

Organic field effect transistors (OFETs) offer many advantages compared to traditional inorganic transistors, such as flexibility and solution processability. In this study we design and synthesize two thienoisatin-based organic semiconducting small molecules, then investigate their electronic properties in n-type OFETs. To introduce n-type charge transport, electron-withdrawing dicyanide moieties were installed on thienoisindigo and bis-thienoisatin molecules, which led to a quinoidal conjugation on thienoisindigo, while maintaining an aromatic conjugation on the bis-thienoisatin. Following the syntheses, the molecules were characterized to determine highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO) levels via cyclic voltammetry, as well as any potential radical properties.

KEYWORDS

Organic electronics, semiconductor, bis-thienoisatin, thienoisindigo