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(57) Abstract :
[031] The present invention relates to a novel class of core- and bay-substituted thionated arylene diimide compounds, including naphthalene diimide (NDI) and perylene diimide (PDI) derivatives, in which one or more oxygen atoms at the imide positions are replaced with sulfur atoms to enhance radical anion formation and stability. These compounds, synthesized using Lawesson's reagent under controlled conditions, are categorized into four classes based on substitution patterns and degree of thionation. The resulting radical anions exhibit tunable optical properties with red-shifted absorption and persistent visible coloration, and their half-lives are significantly enhanced by increasing sulfur content and electronic modifications at the core or bay regions. This invention demonstrates, for the first time, stable radical anions from such substituted thionated structures and offers promising utility in redox catalysis, near-infrared (NIR) absorption, organic electronics, and self-assembled nanomaterials. Accompanied Drawing [FIGS. 1-2]

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