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Polycyclic aromatic hydrocarbons connected with Schiff base linkers: experimental and theoretical photophysical characterization and electrochemical properties

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Abstract: A series of polyaromatic hydrocarbons with anthracene, phenanthrene and pyrene units connected with Schiff base junctions were synthesized via condensation of p-phenylenediamine and hydrazine with selected aldehydes. The effect of both hydrocarbon structures and presence of N-N- or phenyl- linked diimines on properties of the prepared azines and azomethines was analyzed. The obtained compounds were soluble in common organic solvents and melted in the range of 226 - 317°C. Their photophysical and electrochemical properties were investigated by UV-vis, photoluminescence spectroscopies and cyclic voltammetry (CV), respectively. Moreover, a density functional theory (DFT) was applied for calculation of their electronic and geometric structures as well as absorption and emission spectra. Additionally, their electron acceptor activity was preliminary tested in photovoltaic experiment.

Keywords: Schiff bases, azomethines, azines, photoluminescence, electrochemistry, DFT calculations