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Selective Recognition of Palladium Based on Functional Mono Phthalocyanines; Synthesis, Characterization and Photophysical Properties

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Abstract: We report the synthesis and photophysical properties of 4,5-bis(2-((Z)-(3-hydroxynaphthalen-2-yl)methyleneamino)phenylthio)phthalonitrile ligand (SB) and its star-type functional zincphthalocyanine (SB-ZnPc) compound obtained by the condensation of 2,3, 9,10, 16, 17, 23, 24-octakis-(2-aminophenylthio)zincphthalocyanines (A-ZnPc) and 1-hydroxy-2-naphthaldehyde (HNA). Each compound was purified and characterized by elemental analysis, FTIR, ¹H NMR, ¹³C NMR, UV/Vis and MS (Maldi-TOF) spectral data. SB-ZnPc bearing fluorescent SB moieties on the periphery shows selective palladium ion sensing behavior by acting as hard core upon interaction. Electronic spectra of the SB-ZnPc displays pronounced changes in both absorption and fluorescence spectra upon interaction with Pd²⁺ ion. The fluorescence of the SB-ZnPc compound is effectively quenched by treatment with Pd²⁺ in THF solution. The solvent effect on the photophysical properties of the SB-ZnPc and interference effect of foreign metal ions were also investigated.

Keywords: Zinc phthalocyanine, Schiff base, Palladium sensor, Fluorescence quenching

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