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ABSTRACTS



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ABSTRACTS

PW-072 [Inorganic Chemistry]

Tuning the Photophysical Properties and Self-Assembly of BODIPY Dyes Via Hydrogen Bonding

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The self-assembly concept, which provides various properties to molecules, has attracted great interest in recent years. Hydrogen bonding can be admitted as the most important non-covalent interaction for designing supramolecular structures owing to strength and high directionality degree [1]. Barbituric acid has the ability to have directional multiple hydrogen bonds enabling highly ordered fascinating self-assembled structures [2, 3]. It has an active methylene group and can give condensation reactions with aldehydes that do not contain α -hydrogen which is called as Knoevenagel condensation reactions. In this study, barbituric acid substituted BODIPY compounds were synthesized via Knoevenagel condensation reaction between formyl BODIPY and barbituric acid in ethanol reflux without a catalyst giving moderate yield.

The molecular design provide hydrogen bond formation which makes it possible to control the photophysical properties and self-assembly of BODIPY structures by using UV-Vis and fluorescence spectrophotometer, ¹H-NMR spectroscopy, dynamic light scattering and microscopic techniques such as SEM and TEM.

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Keywords: BODIPY, barbituric acid, self-assembly, hydrogen bonding, supramolecular

PW-073 [Inorganic Chemistry]

Homo- and Hetero- Binuclear Cyclometalated Platinum (II) Complexes featuring bridging cyanide ligand: Structural and Photophysical Properties

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Coordination driven self-assembly and metallophilic interactions provide power tools to construct bi- tri-or extended supramolecular luminescent structures featuring different and rich excited states with application in different fields. In this Communication we present a series of homonuclear and heteronuclear cyclometalated(II) complexes featuring cyanide ligand. Homobinuclear symmetrical (NBu₄)[Pt₂(C[^]N)₂(p-MeC₆H₄)₂(μ -CN)] were prepared by reaction of from the corresponding mononuclear anionic complexes Q[Pt(C[^]N)(p-MeC₆H₄)(CN)](C[^]N = bzq, ppy, dfppy) with [Pt(C[^]N)(p-MeC₆H₄)(SMe₂)] (see Scheme). By contrast, neutralization reactions with one equivalent of TIPF₆ provides heteronuclear Pt-Tl compounds in excellent yield (see scheme). Their structures were confirmed by single crystal X-ray diffraction and, as illustration, the structures of (NBu₄)[Pt₂(ppy)₂(p-MeC₆H₄)₂(μ -CN)] and [Pt(dfppy)(C₆F₅)(CN)-Tl]₄ are shown in Figure 1.

The photophysical properties of all compounds were studied in powder, polymer films, and solution states. While the precursors and diplatinum complexes display in rigid media, structured emissions ascribed to typical mixed ³LC/³MLCT excited states, the heteronuclear Pt-Tl compounds, exhibit unstructured strong emissions associated to the formation of metallophilic Pt-Tl bonds. Furthermore, the Pt-Tl compounds show in solid state reversible vapochromic and valuminiscent response to some organic solvent such as MeOH and mechanochromic behavior by simple grinding. As an example, the solvatochromic behavior of [Pt(bzq)(C₆F₅)(CN)Tl(THF)] is given in Figure 2.

Keywords: Organometallic, Platinum, Cyanide, Thallium, Photophysic, DFT

POSTER PRESENTATIONS

Figure 1. a) View of the molecular structure of (NBu₄) [Pt₂(ppy)₂(p-MeC₆H₄)₂(μ-CN)] b) [{Pt(dfppy)(C₆F₅(CN))}-Ti]₄.

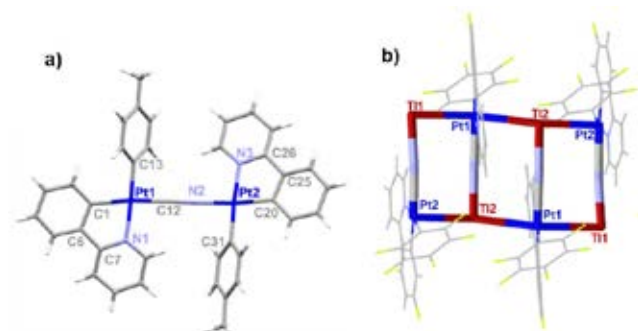
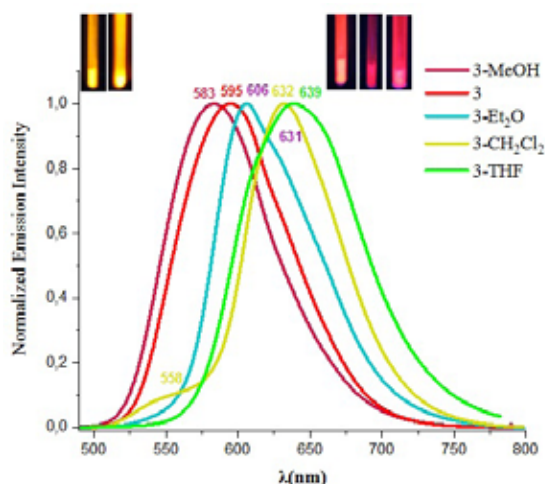
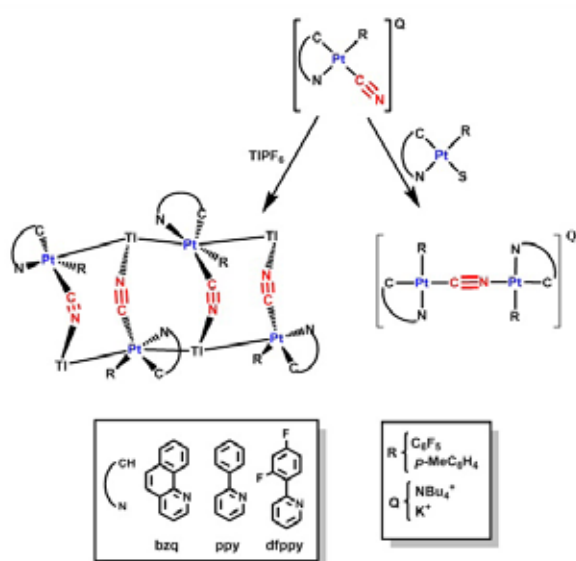


Figure 2. Normalized emission spectra of the orange solid [{Pt(bzq)(C₆F₅(CN))Ti(THF)], of the solvates ([{Pt(bzq)(C₆F₅(CN))Ti(THF)]-solvent). (λ_{ex} 405, 415nm).



Scheme 1: The synthetic routes for Homo- and Hetero- Binuclear Cyclometalated Platinum (II) Complexes.



PW-074 [Inorganic Chemistry]

Investigation of the Chemo-photodynamic Activity of Silicon Phthalocyanines with COX Inhibitors on Colorectal Cancer Cells

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Colorectal cancer (CRC) is the third most common cancer and is the second leading cause of cancer-related deaths [1]. Administration of long-term non-steroidal anti-inflammatory drugs (NSAIDs) may reduce the risk of the development of CRC. Due to the accessibility of the colon by endoscopic methods, photodynamic therapy (PDT) may be used for CRC treatment [2]. In the present study, the anti-cancer activities of sulindac- (Pc-1) [3] and diclofenac-substituted (Pc-2) asymmetric silicon phthalocyanine derivatives were evaluated in four different CRC cell lines. For this purpose, cells were treated with the compounds at various doses and irradiated with 700 nm red light at 1 J optical dose, followed by calculating the IC₅₀ values of the compounds at 24 and 48 hours. Anti-cancer mechanisms of Pc-1 and Pc-2 were evaluated at the 24 and 48 hours by evaluating DNA content analysis and programmed cell death pathways apoptosis and autophagy. The impact of the NSAID residues of the compounds they have was determined by evaluating COX protein levels. The photophysical and photochemical properties of the compounds have been characterized by using different analytical techniques. Our findings indicated that both Pc-1 and Pc-2 inhibited COX expression and activated apoptosis in all cell lines while leading to cell cycle arrest in the G₂/M phase depending on the COX expression profiles of the cell lines tested. These data suggest that NSAIDs can be coupled with phthalocyanine derivatives to combine chemotherapeutic activity with PDT with chemotherapy. to achieve increased anti-cancer activity, especially on cancer cells known to have high COX activity.

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References:

- [1] D Peng; YX Cheng, Y Cheng. Improved Overall Survival of Colorectal Cancer under Multidisciplinary Team: A Meta-Analysis.