Control of Excited States, Nanostructures and Functions Through Molecular Design and Supramolecular Assembly

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Works in our laboratory have shown that novel classes of light-absorbing and luminescent metal-containing molecular materials could be assembled through the use of various metal-ligand chromophoric motifs. In this presentation, various design and synthetic strategies for new classes of chromophoric and luminescent metal complexes will be described. A number of these metal-ligand chromophoric complexes have been shown to display rich luminescence and photofunctional behavior. The chromophoric and luminescence behavior have been studied. Correlations of the chromophoric and luminescence behavior with the electronic and structural effects of the metal complexes have been made to elucidate their spectroscopic origins. Some of these simple discrete metal complexes are found to undergo supramolecular self-assembly or co-assembly with block copolymers to give a variety of nanostructures and morphologies with different colors and emission properties. Subtle changes in the microenvironment, conformations and nanostructured morphologies have led to drastic changes in both the electronic absorption and emission properties of these hierarchical supramolecular assemblies. Explorations into the underlying factors that determine their spectroscopic properties and morphologies as well as their assembly processes have provided new insights into the understanding of their photophysics, structure-property-function relationships, and the interplay of the various intermolecular forces and interactions for the directed assembly of metal-containing supramolecular assemblies and soft materials. Manipulation of the electronic effects, molecular conformation, orientation and assembly has led to the control of the excited states in novel molecular materials and supramolecular assemblies. The exploration into the potential applications and functions of these light-emitting discrete metal complexes, supramolecular assemblies and polymers will also be described.

Biography

Vivian W.-W. Yam obtained both her BSc (Hons) and PhD from The University of Hong Kong, and is currently the Philip Wong Wilson Wong Professor in Chemistry and Energy and Chair Professor of Chemistry at The University of Hong Kong. She was elected to Member of Chinese Academy of Sciences, International Member (Foreign Associate) of US National Academy of Sciences, Foreign Member of Academia Europaea, Fellow of TWAS and Founding Member of Hong Kong Academy of Sciences. She was Laureate of the 2011 L'Oréal-UNESCO For Women in Science Award. She has received a number of awards, including the Josef Michl ACS Award in Photochemistry, RSC Centenary Medal, RSC Ludwig Mond Award, Porter Medal, Bailar Medal, I-APS Presidential Award, FACS Foundation Lectureship Award, APA Masuhara Lectureship Award, JPA Honda-Fujishima Lectureship Award, JPA Eikohsha Award, JSCC International Award, State Natural Science Award, CCS-China Petroleum & Chemical Corporation (Sinopec) Chemistry Contribution Prize, CCS Huang Yao-Zeng Organometallic Chemistry Award, etc. Her research interests include inorganic/organometallic chemistry, supramolecular chemistry and controlled assembly of nanostructures, photophysics and photochemistry, and metal-based molecular and nano-assembled functional materials for sensing, organic optoelectronics and energy research.

Also see: https://chemistry.hku.hk/wwyam/