

## Supramolecular aspects of porphyrins for switching, sensing and sensitizing

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The assembly of organic chromophores will be discussed with emphasis on supramolecular effects. Porphyrins are widely used supramolecular components and we have developed systems used to probe photoinduced intramolecular processes of an oligochromophoric complex including inorganic cofactors.<sup>1</sup> Additionally, we have developed self-assembled systems composed of electron-accepting fullerenes together with the electron-donating porphyrins in order to study photo-induced current generation in those systems. In these latter systems either block copolymer self-assembly<sup>2</sup> or layer-by-layer assembly has been utilized to generate donor-acceptor domains of appropriate dimensions<sup>3</sup> (See Figure 1).

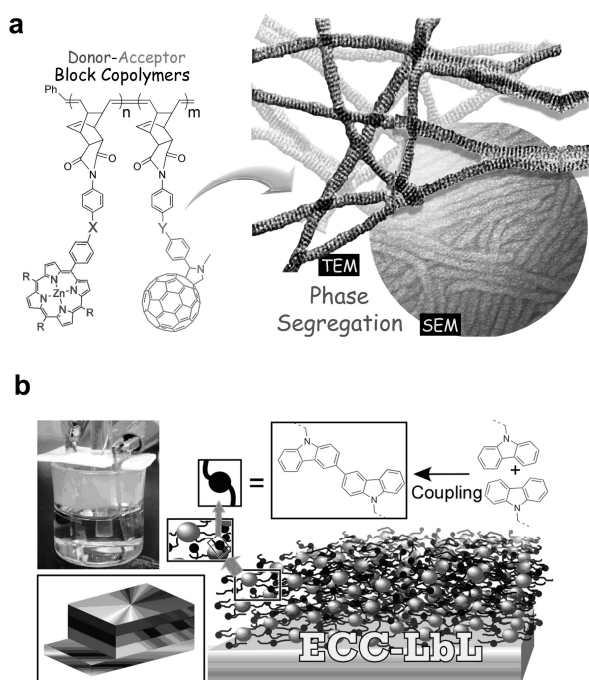


Figure 1. (a) D-A block copolymers for OPV applications. (b) Electrochemically coupled LbL for OPV thin film preparation.

Oxoporphyrinogens are a class of porphyrinoid generally containing a tetrapyrrole macrocycle with oxo or oxocyclohexadienylidene groups substituted at their periphery. They are unique in that their physical structures are coupled to their electronic structures depending on the electrochemical state of the molecule.<sup>4</sup> Additionally, variations in electronic conjugation over the core tetrapyrrole and substituents affect electronic absorptive properties. Using these features we have developed oxoporphyrinogens as molecular switching elements and for sensing applications involving chemical species including water and chiral compounds.<sup>5,6</sup> Tetrapyrroles with two or four conjugating substituents as well as corroles have been prepared and investigated for their properties depending on tautomerism,<sup>7</sup> guest binding by hydrogen bonding and structural changes due to photoredox processes. The syntheses and mechanisms of action of the switching and sensing properties will be presented and discussed.

## References

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