Development of nature-inspired conjugated materials for plastic electronics

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Innovative developments of organic conjugated polymers have been reported to present future potential alternatives to supply photovoltaic energy. Present-day solar energy production is costly due to requiring the expensively processed crystalline silicon, therefore, we are working on developing nanostructured materials that would be low-cost. There have been some recent ongoing advances of using solar cells that are based on the earth-abundant, cheap, non-toxic organic active materials that also are light weight, flexible and its layers makes it versatile. Our research group aims to prepare efficient organic solar energy materials, which can absorb light and transfer to electric energy. This project was inspired by the natural dye, indigo, for its narrow energy band gap, intensive color (high absorbance), and planar structure. Indigo has been accepted among various optoelectronic devices for decades. Its isomer, isoindigo, has better properties, it is fully conjugated, providing more space to be functionalized and the ability to install side groups for better solubility. Our target is the synthesis of thienoisoindigo, which provides even a coplanar structure via the S-O interaction and a lower band gap, with maximum absorbance at a higher wavelength. Our aim in this research, is to test and reach optimum results to develop new organic materials containing isoindigo, thienoisoindigo, or their derivatives units for use in plastic electronic and solar energy applications.

Biography

Mirna Maklad is an undergraduate Chemical Engineering student at Texas A&M University at Qatar.

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