One Material, Dual Functions: Simultaneous Solar Energy Harvesting and Storage

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Solar energy is the cleanest renewable source of energy. Currently, to harvest and store solar energy photovoltaic (PV) devices are coupled with batteries and/or capacitors. Coupling these devices usually involves multiple interfaces through which the generated excited carriers have to traverse. To mitigate the problem of efficiency losses through multiple interfaces, an ideal approach would be a single material that can do both the capturing and storing of solar energy (bi-functional property) in an electrical form simultaneously. The NCN-PHI[1,2] (Poly-heptazine imide) is a known material, which can show this bi-functional property. However, the understanding of how this single material is capable of harvesting and storing solar energy in an electrical form still lacks. Here, in this work, electrochemical and photo-electrochemical studies showcase the key properties that one material should have in order to store its excited charge carriers. The work demonstrates a variety of factors that limit or enhance the stored charge. In addition, work will also be presented that shows how fine-tuning those factors augment the excited electron storage capability.

References-:

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