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Synthesis of substituted porphyrins for use in the structure of perovskite solar cells

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This study has focused on a series of zinc porphyrins that have been used as hole-transporting layers in perovskite solar cells. Hole-transport layers act a significant role in perovskite solar cells for attaining favorable photovoltaic performance with durability. Meanwhile, this series is brominated by NBS(N-bromosuccinimide) which can affect to modulate redox potentials, and also it can complement the enhancement of other electronic properties. Brominated is a part of the halogenation reaction which can significantly increase the excited state lifetime of a Zn porphyrin relative to the unsubstituted complex when it happens in appropriate conditions. A series of zinc-brominated meso -tetraphenyl porphyrins, H2TPPBrx (x = 2, 4,8) have been synthesized. All these series of porphyrins were characterized by chemical analysis, UV-Vis spectroscopy, Photoluminescence spectroscopy, and cyclic voltammetry (CV) studies. It has been observed that all the derivatives of brominated porphyrins represent prominent redshifts in both the Soret and Q bands of their electronic spectra compared to their nonbrominated form. As a result, it can be intelligible how these derivatives of porphyrin improve the power conversion efficiency of perovskite solar cells [1].

Keywords: Bromoporphyrins, hole-transport layers, perovskite solar cells

References

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