Optimizing hydrogel electrolytes for dye-sensitized solar cells

Optimizing Hydrogel Electrolytes for Dye-sensitized Solar Cells

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In this contribution, an investigation on bio-derived hydrogel electrolytes for dye-sensitized solar cells is proposed.

When opportunely developed and optimized, aqueous solar cells can be considered a truly low impact photovoltaic device with non-toxic components [1,2,3]. Moreover, the possibility of gelling the electrolyte into a polymeric matrix can reduce the leakage outside the device, thus increasing the long-term stability. Above all, bio-derived polymers appear promising being renewable and easy available with low cost [4]. Different aqueous electrolytes gelled with carboxymethylcellulose (Na-CMC) or xanthan gum have been prepared with both I-/I3- and Co2+/3+ redox mediators. These gelled systems show good photovoltaic performances, maintaining over 90% efficiency of liquid DSSCs, as well as enhanced long-term stability.

Moreover, we demontrate the use of Experimental Designs (DoE) as a powerful chemometric technique for the concurrent investigation of a number of experimental factors that directly influence the photovoltaic performances of solar cells. Results obtained enlighten that a solid mathematical-statistical approach is fundamental to support the researchers and effectively drive the experiments towards the achievements of optimal operating conditions for aqueous solar cells 5].

References:

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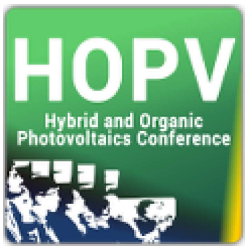

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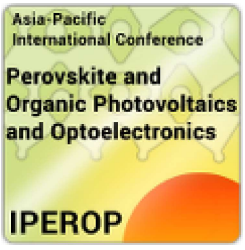

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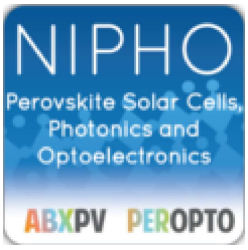

(/perovskite-thin-film-photovoltaics-perovskite-photonics-and-optoelectronics)**International Conference on Perovskite Thin Film Photovoltaics Perovskite Photonics and Optoelectronics (/perovskite-thin-film-photovoltaics-perovskite-photonics-and-optoelectronics)**

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