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Transfer of Preformed 3D Photonic Crystals onto Dye Sensitized Solar Cells

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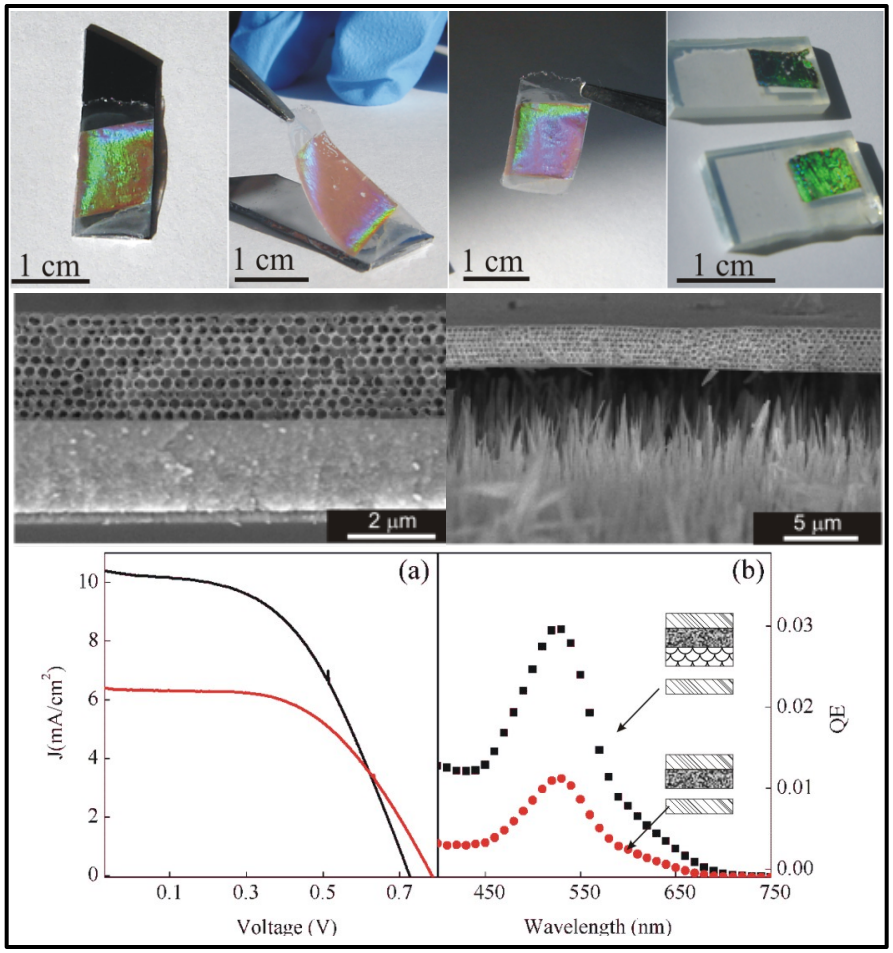

Achievement:

We have developed a method for coupling inverse opal silicon 3D **photonic crystals to dye-sensitized solar cells** (DSSC). The photonic crystal **increases the efficiency** of a model titania DSSC system from 2.3% to 3.2%. Our approach decouples the processing of the photonic crystal from the processing of the solar cell, and thus allows the incorporation of 3D photonic crystals in almost any device.

Significance:

Photonic crystals can greatly **enhance the effective light-matter interactions** within a solar cell. This inexpensive technique **boosts the efficiency** of existing solar cells without changing the original materials of the electrode.

A. Mihi, C. Zhang, and P. Braun, ***Angew. Chem. Int. Ed.*** **50,** 5711-5714 **(**2011)

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LIGHT-MATERIAL INTERACTIONS IN ENERGY CONVERSION