

Photonic management using opal-like crystals in perovskite solar cells

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Perovskite solar cells recently showed a tremendous interest among the photovoltaic community. However, little is known on the effect of light management inside PV architectures. We compare structured and unstructured perovskite MAPbI₃ layers in order to enhance the integrated quantum efficiency. The photoactive layer is made of monolayer, bilayer or trilayer of perovskite spheres inside a TiO₂ matrix. The excitation of guided resonances via Fano resonances inside the absorbing spheres enhances the integrated quantum efficiency and enables a photonic gain as high as 6.4%. Influence of sphere's radius, incident angle and incident polarization on the absorbing properties are also reported.