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.