

Abstract Submitted  
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**Photonic crystals for enhanced absorption in thin film solar materials** RANA BISWAS, Iowa State University and Ames Lab, BENJAMIN CURTIN, Iowa State U, WEIJUN ZHAO<sup>1</sup>, VIKRAM DALAL, Iowa State U — Photonic crystals are designed as back reflectors for thin film amorphous silicon cells. Optimum absorption of red and near infrared photons are found using rigorous scattering matrix simulation. Using photo-lithography and reactive ion etching these photonic-plasmonic crystal substrates have been fabricated and solar cells have been grown on top of them. Experimental solar devices demonstrate 7-8% improved absorption with superior harvesting of red and near infrared photons. Comparison with random roughened back reflectors and plasmonic schemes using metallic nanoparticles will be made.

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