Abstract Submitted
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Hot electron-generated plasmon resonance in ultrathin solar absorbers: Experiment[1] CHAOBIN YANG, JUAN M. MERLO, AARON H. ROSE, JIANTAO KONG, MICHAEL J. BURNS, KRZYSZTOF KEMPA, MICHAEL J. NAUGHTON, Boston College — We describe experimental progress on a hot electron PV structure based on hot electron plasmon protection (HELPP) [1] that provides a path to solar efficiency in excess of the Shockley-Queisser limit. It combines hot electron recovery in ultrathin junctions with superabsorption in metamaterial/plasmonic nanosystems and a HELPP/ plasmon resonance energy transfer (PRET) mechanism. Measurements of optical absorbance (via reflectance and transmittance) of Ag nanopatterns on p- and n-type crystalline and amorphous Si absorbers were performed at incident wavelengths from 350 to 2,500 nm. In samples prepared with Ag nanopatterns with dimensions tuned to provide a resonance near 1,600 nm, we indeed observed such a resonance. We discuss these and other experimental results associated with hot electron-facilitated plasmon resonances.

[1] K. Kempa, "Plasmonic protection of the hot-electron energy," Phys. Stat. Sol. RRL, **7**, 465-468 (2013).

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