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Simulations of enhanced absorption in composite embedded, insulated metal nanopatterns for ultrathin film photovoltaics XINYU LIU, FAN YE, MICHAEL J. BURNS, MICHAEL J. NAUGHTON, Department of Physics, Boston College, Chestnut Hill, 02467 — In recent work [1], a concept of employing embedded metallic nanopatterns (EMN) in ultrathin film solar cells was discussed. Elsewhere in this conference, Fan *et al.* advance this with a scheme for embedded insulated metallic nanopatterns (EIMN) that is designed to avoid deleterious carrier recombination as would result from bare metal inclusions in a PV film. However, a practical route to fabricating EIMNs of desired shapes for eventual scale production is nontrivial. Here, we introduce two notions toward that goal, nano-stamping and spin-coating, of compact arrays of metallic core/insulating shell nanoparticles (MNP). We show by simulations that optical absorption of an EIMN composed of arrays of core-shell MNPs having SiO2 coatings is essentially the same as that of an EMN composed of solid metals without insulation, with absorption concentrated in the surrounding PV medium. These concepts may provide practical routes for scalability of EIMN-based ultrathin film plasmonic solar cells.

[1] F. Ye, M. J. Burns, M. J. Naughton, Proc. SPIE **8111**, 811103 (2011), and this conference.

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