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Micro Solar Cells with Concentration and Light Trapping Optics¹ LANFANG LI, ERIC BREUCKNER, CHRISTOPHER CORCORAN, YUAN YAO, LU XU, RALPH NUZZO, University of Illinois, Urbana — Compared with conventional bulk plate semiconductor solar cells, micro solar cells provide opportunity for novel design geometry and provide test bed for light trapping at the device level as well as module level. Surface recombination, however, will have to be addressed properly as the much increased surface area due to the reduced dimension is more prominent in these devices than conventional solar cells. In this poster, we present experimental demonstration of silicon micro solar cells with concentration and light trapping optics. Silicon micro solar cell with optimized surface passivation and doping profile that exhibit high efficiency is demonstrated. Effective incorporation of high quantum yield fluorescent centers in the polymer matrix into which micro solar cell was encapsulated was investigated for luminescent solar concentration application. Micro-cell on a semi-transparent, nanopatterned reflector formed by softimprint lithography was investigated for near field effect related solar conversion performance enhancement.

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