Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

High performance encapsulation structures utilizing Russian Doll architectures JIMMY GRANSTROM, Mitsubishi Chemical Center for Advanced Materials, University of California Santa Barbara, MICHAEL VILLET, Department of Chemical Engineering, University of California Santa Barbara, TIRTHA CHATTERJEE, Mitsubishi Chemical Center For Advanced Materials, University of California Santa Barbara — A Russian Doll encapsulation architecture utilizing pairs of free-standing barrier films and epoxy seals separated by nitrogen spacers is presented, enabling the use of low-cost epoxy to attach two or more free-standing barrier films to a substrate with improved barrier performance. The performance of various Russian Doll encapsulations was evaluated with the calcium thin film optical transmission test, showing improved performance of the Russian doll configuration relative to a non-nested barrier/spacer architecture, and demonstrating that water vapor transmission rates of 0.0021 g/(m^2, day) or below can be achieved with low-cost materials in this architecture. This WVTR correlates to a predicted lifetime of more than 10 years for inverted organic P3HT:PCBM bulk heterojunction solar cell modules fabricated and tested by Konarka Technologies (Lowell, MA, USA).

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Date submitted: 02 Nov 2009 Electronic form version 1.4