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Temperature dependence of polymer hybrid solar cells YUKO NAKAZAWA, SUE CARTER, UC Santa Cruz — This presentation focuses on understanding the temperature dependent behaviors of polymer hybrid photovoltaic (PV) devices. The PV devices in this study consisted of a thin layer of PPV- based semiconducting polymer (M3EH-PPV) sandwiched between PEDOT and Al. Device architectures were modified by blending electron accepting CN- ether-PPV or PCBM in the photoactive layer, and evaporating LiF prior to Al (bulk heterojunction cells). Comparison will also be made between bulk and interfacial heterojunction structures, which consisted an additional layer of n-type semiconductor. Current-voltage characteristics were measured in a temperature- controlled cryostat to study the temperature dependence of PV parameters. Short circuit current (I_{sc}) and open circuit voltage (V_{oc}) were measured between 150 K and 400 K. The results showed Isc were more strongly affected by mobility in bulk heterojunction cells than in interfacial heterojunction structures. V_{oc}(T) were predominantly determined by device architecture than the mobility. Difference in underlying mechanism for polymer hybrid solar cells will be discussed.

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