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Spectroscopy and Imaging of Metal-Organic Interfaces using BEEM CEDRIC TROADEC, LINDA KUNARDI, NATARAJAN CHANDRASEKHAR, Institute of Materials Research and Engineering (IMRE) — Charge injection from metal electrodes to organics is a subject of intense scientific investigation for organic electronics. Ballistic electron emission microscopy enables spectroscopy and imaging of buried interfaces with nanometer resolution. Spatial non-uniformity of carrier injection is observed for an Ag-PPP and an Ag-MEHPPV interfaces. Possible reasons are discussed. BEEM current images are found to correlate only marginally with the surface topography of the Ag film. We also determine the transmission function of the Ag-PPP interface. The transmission function is inferred from the derivative of the measured BEEM spectrum, and compared with theory, and with the transmission of metal inorganic semiconductor (MIS) interfaces. For Ag-PPP, we find a curvature opposite to that of MIS interfaces. This agrees well with the theoretical calculations on metal-phenyl ring interfaces. We demonstrate that patches of low Schottky barrier can nucleate current filaments and are likely responsible for the switching behavior observed in metal-organics.

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