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Charge dissipation measurement on the surface of polymeric materials using modified surface potential electric force microscopy MICHAEL REAGAN, SERGEI LYUKSYUTOV, IVAN DOLOG, ROBERT MALLIK, The University of Akron, OH, SHANE JUHL, RICHARD VAIA, MICHAEL DURSTOCK, JOHN FERGUSON, AF Research Laboratory, WPAFB OH — The AFMEN technique when combined with surface potential electric force microscopy (SP-EFM) reveals the pattern of electric charge build-up and dissipation in polymeric and organic materials. This information can be used to develop an adequate description of nanoconductivity in these materials. The description includes effects due to local electric field variations and charge transport mechanisms. Charge evolution was estimated by measuring electric currents using AFM. In addition to the SP-EFM and AFM work outlined above, we also use Inelastic Electron Tunneling Spectroscopy (IETS) to characterize the electronic and vibrational properties of polymer and composite materials. IETS has been used in the past by one of the authors to investigate ultra-thin (roughly 1 nm) polymer films, including PMMA. The films were deposited either by spin coating from or by plasma polymerization. This work is being extended to study the adsorption of spin-coated PMMA on photovoltaic materials such as CdS. Temperature dependent current-voltage and conductance voltage data obtained from tunnel diodes containing CdS/PMMA heterolayers can be used to determine the conduction mechanisms in these layers.

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