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Positron Annihilation Spectroscopy as a Novel Interfacial Probe for Thin Polymeric Films and Nano-Composites SOMIA AWAD, HONGMIN CHEN, GRACE MAINA, University of Missouri-Kansas City, L. JAMES LEE, The Ohio State University, XIAOHONG GU, National Institue of Standards and Technology, Y.C. JEAN, University of Missouri-Kansas City — Positron annihilation spectroscopy (PAS) has been developed as a novel probe to characterize the sub-nanometer defect, free volume, profile from the surface, interfaces, and to the bulk in polymeric materials when a variable mono-energy slow positron beam is used. Free-volume hole sizes, fractions, and distributions are measurable as a function of depth at the high precision. PAS has been successfully used to study the interfacial properties of polymeric nanocomposites at different chemical bonding. In nano-scale thin polymeric films, such as in PS/SiO_2, and PU/ZnO, significant variations of T_g as a function of depth and of wt% oxide are observed. Variations of T_g are dependent on strong or weak interactions between polymers and nano-scale oxides surfaces.

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