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Adhesion Enhancement of Amino-functional Organosilanes for Polystyrene Thin Films SUNG-HWAN CHOI, BI-MIN ZHANG NEWBY, The University of Akron — Amino-functional organosilanes, such as 3-aminopropyltriethoxysilane (APTES), have been utilized widely as adhesion promoters. Recently, APTES was also found to have the ability to prevent polymer thin films from separating, or dewetting, from substrates. Common reasons, such as forming chemical bonds with $-NH_2$ or electrostatic interactions between APTES molecules and the materials of interest, cannot be applied to explain the strong adhesion enhance of polymeric materials observed on the APTES surfaces. Since APTES contains the active terminal $-NH_2$ group, which can interact with the multiple active head groups and the substrate, the APTES molecules likely link together and form multi-layered networks when grafted to a substrate. The multi-layered networks may result in large enough loops for the polymer chains to slide into and create entanglement/interlocking, thus enhancing the adhesion or stability of the polymer films upon subjecting to a separation force. The hypothesis was verified using dewetting studies of polystyrene thin films from APTES surfaces.

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