Abstract Submitted
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Unveiling the Dynamics of Self-Assembled Layers of Thin Films of PVME by Nanosized Relaxation Spectroscopy[1] SHERIF MADKOUR, Bundesanstalt fuer Materialforschung und pruefung , PAULINA SZYMONIAK, Bundesanstalt fr Materialforschung und prfung - (BAM), ANDREAS SCHOENHALS, Bundesanstalt fuer Materialforschung und pruefung , NANOTRIBOLOGY AND NANOSTRUCTURING OF SURFACES TEAM — For thin polymer films, little is known about the dynamics of adsorbed layers. Here, Broadband Dielectric Spectroscopy (BDS) was utilized to investigate the glassy dynamics of thin films of a low M_W Poly (vinyl methyl ether) (PVME) (thicknesses: 7 - 160 nm). A recently developed nano-structured capacitor arrangement was employed; where a silicon wafer with nanostructured SiO_2 nano-spacers, with heights of 35 nm and 70 nm, is placed on top of a thin film spin coated on an ultra-flat highly conductive silicon wafer. Further, PVME/SiO_2 interactions were confirmed by contact angle measurements. For films with thicknesses smaller than 50 nm, BDS measurements showed two relaxation processes. The first process coincided, in its position and temperature dependence, with the α-relaxation of bulk PVME, thus it was assigned to the α-relaxation of a bulk-like layer. The second process showed a different temperature dependence and was ascribed to the relaxation of polymer segments adsorbed at the substrate. Both processes showed no thickness dependence. The results will be discussed in detail. To our knowledge, this is the first study of the segmental dynamics of an adsorbed layer in thin films.

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