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Ellipsometric Investigation of the Surface Dynamics of a Polymer Film near the Glass Transition Temperature[1] ASHIS MUKHOPADHYAY, CHRISTOPHER GRABOWSKI, Wayne State University — We have investigated the surface dynamics of poly (butyl methacrylate) films by using a phase-modulated ellipsometer, which can measure thickness at angstrom-level resolutions. Experiments were performed for a range of temperatures, both above and below the glass transition temperature (Tg) of this system. Thickness-thickness correlation functions were calculated at each temperature using ellipsometry data collected at 200 Hz frequency. Our results indicate that, above Tg, the relaxation time stays relatively constant ($\sim$1 sec) and the correlation functions obey a simple exponential decay. As Tg is approached, a dramatic increase in the relaxation time is observed and the correlation functions are best fitted with a stretched exponential Kohlrausch-Williams-Watts (KWW) relation.

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