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Viscosity Measurements of Very Thin Polymer Films CHUNHUA LI, TADANORI KOGA, CLIVE LI, JUN JIANG, State University of New York at Stony Brook, LAURENCE LURIO, Northern Illinois University, SUNIL SINHA, University of California San Diego, SURESH NARAYANAN, Argonne National Laboratory, MIRIAM RAFAILOVICH, JONATHAN SOKOLOV, State University of New York at Stony Brook, STATE UNIVERSITY OF NEW YORK AT STONY BROOK TEAM, UNIVERSITY OF CALIFORNIA SAN DIEGO COLLABORATION, NORTHERN ILLINOIS UNIVERSITY COLLABORATION, ARGONNE NATIONAL LABORATORY COLLABORATION — We reported that the viscosity of ultra thin polymer films can be measured by three independent techniques: Bilayer dewetting measurements where the viscosity is derived from dewetting velocity; X-ray Photon Correlation Spectroscopy (XPCS) where the viscosity is determined from the relaxation rate of thermally induced surface roughness and Dynamic Secondary Ion Mass Spectroscopy (DSIMS) where the viscosity is derived from the measurements of the tracer diffusion coefficient. The results from three different techniques are in good agreement with each other. The scaling relationship, $\eta \sim$Mw PS, yielded from dewetting and XPCS measurement was in excellent agreement with the bulk scaling of 3.4 and the prediction from reptation theory.

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