

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Confinement Effect on the Effective Viscosity of Plasticized Polymer Films**<sup>1</sup> FEI CHEN, D. PENG, Boston University Physics Department, Y. OGATA, K. TANAKA, Kyushu University Department of Applied Chemistry, Z. YANG, Soochow University Department of Polymer Science and Engineering, Y. FUJII, National Institute for Materials Science (Japan), N. L. YAMADA, Neutron Science Laboratory High Energy Accelerator Research Organization (Japan), C. H. LAM, Hong Kong Polytechnic University Department of Applied Physics, OPHELIA K. C. TSUI, Boston University Physics Department — We have measured the effective viscosity of polystyrene films with a small (4 wt%) added amount of dioctyl phthalate (DOP) deposited on silica. A broad range of molecular weights,  $M_w$ , from 13.7 to 2,100 kg/mol was investigated. Our result shows that for the thin films with  $M_w < \sim 100$  kg/mol, the addition of DOP causes the effective viscosity to decrease by a factor of  $\sim 4$ , independent of  $M_w$ . But for the higher  $M_w$  films, the effective viscosity of the DOP added films creeps towards that of the neat films with increasing  $M_w$ . A model assuming the effective viscosity to be dominated by enhanced surface mobility for the lower  $M_w$  films, but surface-promoted interfacial slippage for the higher  $M_w$  films is able to account for the experimental observations.

<sup>1</sup>We are grateful to the support of National Science Foundation through the project DMR-1310536.

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Date submitted: 05 Nov 2015

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