

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Are polymers glassier upon confinement?** SIMONE NAPOLITANO, JEAN SPIECE, DANIEL E. MARTINEZ-TONG, MICHELE SFERRAZZA, Université Libre de Bruxelles (ULB), AURORA NOGALES, Instituto de Estructura de la Materia, CSIC Madrid — Glass forming systems are characterized by a stability against crystallization upon heating and by the easiness with which their liquid phase can be transformed into a solid lacking of long-range order upon cooling (glass forming ability). Here, we discuss on the the thickness dependence of the thermal phase transition temperatures of poly(L-lactide acid) thin films supported onto solid substrates [1]. The determination of the glass transition ( $T_g$ ), cold crystallization ( $T_{CC}$ ) and melting ( $T_m$ ) temperatures down to a thickness of 6 nm via ellipsometry, permitted us to build up parameters describing glass stability and glass forming ability. We observed a strong influence of the film thickness on the latter, while the former is not affected by 1D confinement. Remarkably, the increase in  $T_g/T_m$  ratio, a parameter related to glass forming ability, is not accompanied by an increase in  $T_{CC}-T_g$ , as observed on the contrary, in bulk metallic glasses. We explained this peculiar behavior of soft matter in confinement considering the impact of irreversible adsorption on local free volume content [2]. [1] J. Spiece et al. *Soft Matter*, 2015,11, 6179-6186 [2] *Non-equilibrium Phenomena in Confined Soft Matter*, S Napolitano (ed.) Springer, 2015

Simone Napolitano  
Université Libre de Bruxelles (ULB)

Date submitted: 23 Oct 2015

Electronic form version 1.4