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Abstract

We study the effect of bimodal molecular weight distribution on glass transition of polystyrene (PS) under one-dimensional confinement by employing hot-stage spectroscopic ellipsometry. The bulk PS is found to have an exceptionally low glass transition temperature (T_g) of around 61 °C. This intriguing finding is attributed to the presence of a sizable fraction of very low molecular weight components (∼3000 g/mol). A further suppression of T_g compared to the already reduced bulk value is observed upon reduction of the film thickness. We also observe that glass transition width of the bulk PS is broader than its monodisperse counterpart which is further broadened upon confinement.

Keywords: polymer thin films, polydispersity, polystyrene, glass transition

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