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Effect of film processes on the chain conformations of adsorbed polymer nanolayers[1] MANI SEN, MAYA K. ENDOH, TADANORI KOGA, Department of Materials Science and Engineering, Stony Brook University, Stony Brook, NY 11794-2275, DAISUKE KAWAGUCHI, Education Center for Global Leaders in Molecular Systems for Devices, Kyushu University, Fukuoka 819-0395, Japan, KEIJI TANAKA, Department of Applied Chemistry, Faculty of Engineering, Kyushu University, Fukuoka 819-0395, Japan — Polymer chains adsorb even onto weakly attractive solid surfaces, resulting in the formation of adsorbed polymer nanolayers ("PNs"). We report how film processing affects the chain conformations composed of PNs. 50 nm thick polystyrene (PS, Mw=290 kDa) thin films were prepared onto hydrogen-passivated silicon substrates by using two different processes (i.e., spin coating and dip coating). The PNs were then formed by high temperature thermal annealing and subsequent rinsing with a good solvent. We characterized the PNs using x-ray reflectivity (XR), atomic force microscopy (AFM), and sum-frequency generation spectroscopy. The XR and AFM data reveal that the homogenous PNs are composed of the two different architectures regardless of the film processing: flattened polymer chains that constitute the inner higher density region of PNs and loosely adsorbed polymer chains that form the outer bulk-like density region although adsorbed chain conformations from the two processes are different.

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