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Internal and Interface Structure in Diblock Copolymer Brushes. M.D. Foster¹, B. Akgun¹, G. Ugur¹, W.J. Brittain¹, X. Li², D.R. Lee², J. Wang², ¹Maurice Morton Inst. of Polymer Science, Univ. of Akron, Akron, OH 44325, ²Experimental Facilities Division, Argonne National Laboratory, Argonne, IL 60439.

Internal and surface structure of polystyrene-*b*-polyacrylate diblock copolymer brushes have been studied using grazing-incidence small-angle X-ray scattering (GISAXS) and atomic force microscopy (AFM). Polystyrene-*b*-polyacrylate or polyacrylate-*b*-polystyrene brushes were synthesized using atom transfer radical polymerization. Poly (methylacrylate) or poly(*n*-butyl acrylate) is used as the acrylate block. Each as-deposited diblock brush shows an internal lateral structure with a spacing comparable to the thickness of the top layer of the brush on the order of 10 nm. After a brush is treated with a solvent which is a good or theta solvent for the bottom block and poor solvent for the top block, Bragg rods appear in GISAXS pattern. The lateral spacing corresponding to the Bragg rods is on the order of the total thickness of the brush. This lateral correlation is also detected by the power spectral density analysis of the AFM measurements of the samples' surfaces using tapping mode imaging. The Bragg rods disappear upon heating to 80 °C and this behavior does not depend on which polyacrylate block was used.