

Abstract Submitted
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Nanoscale Substrate Roughness for the Tailored Control of Block Copolymer Thin film Orientation¹ JUSTIN CHEUNG², MANI SEN, MAYA ENDOH, TADANORI KOGA, Stony Brook University — Directed self-assembly of block copolymers (BCP) in thin films is crucial to many technologies. Of interest is the ability to engineer the orientation of BCP cylinder formation on solid substrates. Here we report the capacity of a homopolymer “substrate” with tailored nanoscale surface roughness to control BCP cylinder orientation. Poly-2-vinylpyridine (P2VP) nanometer-thick adsorbed polymer layers (“adsorbed nanolayers”) were prepared on cleaned Si substrates using a solvent leaching process [1]. Additionally, it was demonstrated that the length of annealing time allowed for control over surface roughness of the P2VP adsorbed nanolayers [1]. Polystyrene-*block*-poly (4-vinylpyridine) (PS-*b*-P4VP) was then spin cast atop the P2VP adsorbed nanolayer and thermally annealed. A suite of experimental techniques evidenced the formation of perpendicularly oriented cylinders in PS-*b*-P4VP thin films (30-120 nm in thickness) on the underlying roughened P2VP surface, while the parallel orientation was favored on a smooth Si surface coated with a native oxide layer. Details will be discussed in the presentation. [1] N. Jiang et al., *Macromolecules*, 47, 2014, 2682

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²JC is an undergraduate student at SBU.

Justin Cheung
Stony Brook University

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