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**Log-rolling block copolymers cylinders** SO YOUN KIM, YE CHAN KIM, DONG HYUP KIM, NA KYUNG KWON, Ulsan National Institute of Science and Technology, RICHARD A. REGISTER, Princeton University — Shear has been the most effective method to create long range order of micro- or nano- structures in soft materials. When shear is applied, soft particles or polymers tend to align along the shear direction to minimize the viscous dissipation, thus transverse (so-called log-rolling) alignment is disfavored. In this study, for the first time we report the transverse alignment of cylinder-forming block copolymers. Poly(styrene-*b*-methyl methacrylate), PS-PMMA, can form a metastable hemicylinder structure when confined in a thin film, and this hemicylinder structure can align either along the shear direction, or transverse to the shear direction (log-rolling), depending on the shearing temperature. This unusual log-rolling behavior is explained by the different chain mobility of the two blocks in PS-PMMA; the rigidity of core cylinder is the critical parameter determining the direction of shear alignment.

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