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**Structural Formation Process of Microphase Separated Films with Liquid Crystalline Phase Transition** MOTONORI KOMURA, TOMOKAZU IYODA, Tokyo Institute of Technology — Ordered nanostructures arising from the microphase separation of block copolymers have driven one to fabricate nanofunctional materials as fundamental technology of the coming electronic and photonic materials. Thin films of a series of newly designed amphiphilic block copolymer consisting of hydrophilic polyethylene oxide (PEO) and hydrophobic polymethacrylate with azobenzene-mesogen in side-chain (PMA(Az)) show highly ordered microphase separation with PEO cylinders perpendicularly oriented to the film surface. In the present report, we investigated a structural formation process of the microphase separated films by temperature controlled atomic force microscopy (AFM) and grazing incidence small angle X-ray scattering (GISAXS). These measurements revealed that homeotropic alignments of Az liquid crystalline layers predominated the cylinder orientation, which corresponded to a  $\langle 110 \rangle$  direction of body centered cubic structure under annealing condition, in disagreement with cylinder orientation of order-order transition of traditional block copolymers.

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