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Grain Structure in Block Copolymer Thin Films Studied by Guided Wave Depolarized Light Scattering JEFFREY WILBUR, AMISH PATEL, DAVID DURKEE, RACHEL SEGALMAN, NITASH BALSARA, UC Berkeley, BRUCE GARETZ, MAURICE NEWSTEIN, Polytechnic University, ALEXANDER LIDDLE, Lawrence Berkeley National Lab — A new optical technique for characterizing the grain structure of ordered block copolymer thin films has been developed. The technique is an adaptation of previous work wherein polarized light was used to characterize the grain structure in bulk block copolymer samples. Thin films of a cylindrically ordered poly(alpha methyl styrene-*block*-isoprene) copolymer were prepared on flat fused silica substrates. A plane-polarized laser beam was coupled into and out of a transverse magnetic (TM) mode of each film, which acts as planar waveguide. The polarization of some of the incident light changes due to encounters with randomly oriented optically anisotropic grains. This results in the coupling of light into transverse electric (TE) modes in the sample. We show that the TE intensity of samples with well-developed grain structure is significantly larger than that obtained from samples with poorly developed grain structure.

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