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Interfacial Characterization of Poly(methyl methacrylate) with Non-solvents YOSHIHISA FUJII, HIRONORI ATARASHI, Kyushu University, MASAHIRO HINO, Kyoto University, KEIJI TANAKA, TOSHIHIKO NAGAMURA, Kyushu University — Density profiles of a perdeuterated poly(methyl methacrylate) (dPMMA) film in water, hexane and methanol, which are 'non-solvents' for dPMMA, were studied by neutron reflectivity (NR). The interfaces of dPMMA with the liquids were diffuse in comparison with the pristine interface with air; the interfacial width with water was thicker than that with hexane. Interestingly, in water, the dPMMA film was composed of a swollen layer and the interior region, which also contained water, in addition to the diffused layer. The interface of dPMMA with hexane was sharper than that with water. Although there were slight indications of a swollen layer for the dPMMA in hexane, the solvent molecules did not penetrate significantly into the film. On the other hand, in methanol, the whole region of the dPMMA film was strikingly swollen. The modulus of dPMMA in the vicinity of the interfaces with liquids was also examined on the basis of force-distance curves measured by atomic force microscopy. The modulus decreased closer to the outermost region of the film. The extent to which the modulus decreased in the interfacial region was consistent with the amount of liquid sorbed into the film.

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