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Dynamics of Surface Reorganization of Poly(methyl methacrylate) in Contact with Water AYANOBU HORINOUCHI, Department of Applied Chemistry and International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University, HIRONORI ATARASHI, YOSHIHISA FUJII, KEIJI TANAKA, Department of Applied Chemistry, Kyushu University — New tools for tailor-made diagnostics, such as DNA arrays and tips for micro-total-analysis systems, are generally made from polymers. In these applications, the polymer surface is in contact with a water phase. However, despite the importance of detailed knowledge of the fundamental interactions of polymer interfaces with liquids, such studies are very limited. As an initial benchmark for designing and constructing specialized biomedical surfaces containing polymer, aggregation states and dynamics of chains at the water interface should be systematically examined. We here apply time-resolved contact angle measurement to study the dynamics of the surface reorganization of poly(methyl methacrylate) (PMMA) in contact with water. By doing the measurements at various temperatures, it is possible to discuss the surface dynamics of PMMA based on the apparent activation energy. Also, sum-frequency generation spectroscopy revealed that the surface reorganization involves the conformational changes in the main chain part as well as the side chains. Hence, the dynamics observed here may reflect the segmental motion at the outermost region of the PMMA film, in which water plays as a plasticizer.

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