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3:30 pm

Room 8335
Chemistry Building

Structure and dynamics of polymers at interfaces

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In the future, the quantity of polymeric materials used for medical diagnosis and treatment will continue to increase. Examples of these are applications as new tools for tailor-made diagnostics such as DNA arrays and tips for micro-total-analysis systems. Ultimately, we can expect that polymers will be found inside the human body as an integral part of organs and an in situ diagnostic or treatment equipment. 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. We here show peculiar structure and dynamics of polymers at interfaces with non-solvents, mainly water, on the basis of scattering and spectroscopic measurements. As a different class of polymer interface, we also focus on the inorganic materials, which should play a crucial role for polymer nanocomposites, thin multilayer devices, etc. Using surface interfacial sensitive spectroscopy, the local conformation and relaxation of polymer chains in a film at a substrate interface were discussed. We found out that polymer chains at the interface with solid substrates can be only partially relaxed under conditions where the bulk chains are expected to be fully relaxed. On the other hand, the interfacial chains could be easily relaxed by solvent annealing.