

Abstract Submitted
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Revealed nano-architecture and dynamics of bound polymer layers on nanofillers¹ TADANORI KOGA, NAISHENG JIANG, MAYA ENDOH, Stony Brook University, TOMOMI MASUI, HIROYUKI KISHIMOTO, Sumitomo Rubber Industries, TAKASHI TANIGUCHI, Kyoto University, HIROSHI WATANABE, Institute for Chemical Research, Kyoto University, MICHIHIRO NAGAO, Center for Neutron Research, NIST — It is known that the physical properties of adsorbed polymers on solids are often different from those of bulks. However, the mechanism associated with the structure and dynamics at the polymer/solid interfaces still remains unsolved, primarily due to the lack of suitable experimental tools. Recently, we used small-angle neutron scattering and neutron spin-echo spectroscopy which allow us to highlight adsorbed polymers on nanofillers with deuterated labeling. The system used was polybutadiene (PB) adsorbed on carbon black (CB) fillers in toluene. The CB (80 nm in diameter) was compounded into PB by using a Banbury mixer. The CB/PB compound was then dissolved in toluene, until the weight of the compound remained unchanged. To label the resultant un-dissolved PB layer on CB (i.e., about 3 nm in thickness based on TEM analysis) for the neutron scattering experiments, deuterated toluene, which has the nearly same scattering length density as that of CB, was used. We will highlight the unique structure and dynamics of the bound PB layer by comparing with a PB brush grafted on CB and further discuss geometric effects of solids (curvature or flat) on the nano-architectures at the polymer/solid interfaces.

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Tadanori Koga
Stony Brook University

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