

Abstract Submitted
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Kinetics of Polymer Interfacial Reaction SHUO ZHANG, JEFFREY KOBERSTEIN, Columbia University — Germanium crystals modified with high quality azide functional monolayers are used to directly monitor in situ the kinetics of interfacial “click” reactions with complementary alkyne end-functional poly(*n*-butyl acrylate) (PnBA) and polystyrene (PS) by attenuated total reflectance infrared spectroscopy (ATR-IR). In the presence of copper (I), the azide-modified Ge substrates react quantitatively with PnBA and PS via a 1,3-dipolar cycloaddition reaction. Time-resolved ATR-IR measurements show two regimes of kinetic behavior, as predicted by theory. In the first regime the rate is rapid and is controlled by diffusion of the polymer through the solvent, scaling with the square root of time. The rate slows considerably in the second regime, limited by penetration of the reacting polymer through the covalently bound polymer brush layer, scaling with the natural logarithm of time. The influence of polymer size and solvent quality are reported.

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