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Shear-Dependent Interactions in Rheology Modifier (RM)-Latex Suspensions TIRTHA CHATTERJEE, ALAN I. NAKATANI, Analytical Sciences, The Dow Chemical Company, ANTONY K. VANDYK, Dow Coatings Materials, The Dow Chemical Company — Paint viscosity, under shear is governed by its shear-induced structure which in turn controls the application properties. The micro and macroscopic structure of the RM-latex combinations under shear is central to understand paint application behavior. Using in-situ shear-small-angle neutron scattering (shear-SANS) the RM-latex structure has been studied. All studies reported here are performed on acrylic-based latex with different hydrophobically modified ethoxylated urethane (HEUR) RM varying in their hydrophobe density/chain. At a quiescent condition, latex and RM form a spherical core-shell structure, with latex particles being the core and adsorbed RMs on the surface forming the shell. The shell thickness decreases with increasing RM hydrophobe density/chain. Under shear, the solvent (D2O/H2O) is squeezed out (hydrodynamic squeezing) from the swollen RM chains and the shell structure becomes denser and *anisotropic* due to differing degrees of compression along the flow and vorticity directions. An effective shear-dependent latex-RM hydrodynamic volume fraction has been calculated using SANS structural data. High shear viscosity calculated on the basis of effective hydrodynamic volume using existing models do not match with the experimental data. This suggests the existence of RM molecule mediated interactions even at high shear rate.

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