

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Novel Characterization of Critical Micelle Concentrations of Block Copolymers and Gradient Copolymers in Homopolymer ROBERT SANDOVAL, DANIEL WILLIAMS, CHRISTOPHER WONG, JUNGKI KIM, JOHN TORKELSON, Northwestern University — Here we demonstrate a new method based on the intrinsic fluorescence of styrene-containing block copolymers and gradient copolymers to determine the critical micelle concentrations (cmcs) of copolymers present at low levels in homopolymer. The method relies on the fact that when styrene/methyl methacrylate (S/MMA) block copolymers and gradient copolymers are well dispersed in a glassy homopolymer such as poly(methyl methacrylate) (PMMA), only monomer fluorescence and no excimer fluorescence is observed from the copolymer. When micelle formation occurs, then excimer fluorescence is present. With this simple method, we have found that gradient copolymers yield much lower cmc values (about an order of magnitude smaller) than comparable block copolymers of similar molecular weight and overall composition. We are extending these studies to consider the effects of block copolymer molecular weight and composition as well as homopolymer molecular weight on the cmc values. While these parameters have received heavy consideration from a theoretical standpoint, little experimental work has focused on these issues.

John Torkelson
Northwestern University

Date submitted: 27 Nov 2007

Electronic form version 1.4