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Study of Brij Micelles Using Dynamic Light Scattering Spectroscopy KAREN WILSON, MIKE LEKAN, KIRIL STRELETZKY, Cleveland State University — We studied properties of Brij-35 surfactant micelles using Dynamic Light Scattering (DLS) and Optical Probe Diffusion method. Aqueous solutions of Brij-35 with concentrations ranging from 2 to 100g/L were prepared, both with and without polystyrene latex probes of diameters 24, 50, 282, and 792nm. Solutions were studied at four temperatures of 10, 25, 40, and 70^{o}C with DLS to obtain micelle and probe diffusion coefficients (D_m, D_p). Using both diffusion coefficients we deduced micelle radius (a_m), micelle water content (δ), and number of surfactant molecules per micelle (N) using two different models. First, we used the hard sphere model of micelle/probe interaction to analyze the data by two methods. In this model, a_m is obtained from Stokes-Einstein equation using the intercept of D_m(c). The first method of the model uses the slope of D_m(c) and the size of probes to determine N and δ. The second method of the model uses the linear least-squares fit of D_p(c) for different probe sizes to determine N and δ. Both methods reveal that with solution temperature increase, a_m increases by 10%, N increases and δ decreases by a factor of 2. Two hard sphere methods yield somewhat different trends, but overall agree with published data on Brij micelles. The second model treats micelles as core-shell particles and uses D_m(c) to determine not only a_m, δ, and N, but also micelle corona radius a_c.

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