Coexistence curve of a near-critical, eight-arm star polystyrene in methylcyclohexane

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Physics Department, The College of Wooster, Wooster OH 44691 — The coexistence curve of eight-arm star polystyrene in methylcyclohexane has been measured and used to determine the coexistence curve amplitude $B$. An automated measurement of the minimum deviated angle in each phase provides the refractive index and thus the composition in each phase. By exploring temperatures from a few milliKelvins to two Kelvin below the critical temperature, the shape of the coexistence curve is determined and compared to a simple power law of amplitude $B$ and exponent $\beta$. The exponent should be independent of molecular weight while the amplitude should vary as a power-law in molecular weight. We report the results of one molecular weight (228,000) and compare them to published values for a smaller molecular weight (74,000) and to the results for a linear polystyrene in the same solvent. We acknowledge the support from the donors of the American Chemical Society Petroleum Research Fund.

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