

A Study of Density Fluctuations in Supercritical Fluid Selenium by Small Angle X-ray Scattering Measurements

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Small angle X-ray scattering (SAXS) measurements for dense Se vapour have been carried out to investigate the characteristics of density fluctuations near the critical density region. The correlation lengths of density fluctuations and the number-density fluctuations have been measured precisely at different temperatures and pressures near the critical point. We have also estimated the densities at those temperatures and pressures by using absorption method of X-ray intensities at the same time. In this paper we have also described how we have overcome many difficulties to improve our experimental condition and finally achieved less noisy spectra with better fitting condition to calculate correlation lengths of density fluctuations. Larger values of correlation length of density fluctuations (and also the number density fluctuations) are obtained near the critical density region. The correlation length of density fluctuations as well as number density fluctuations increases as we approach the critical point of fluid Se along the path of critical density region.