

Liquid-Liquid Coexistence Curves Obtained from Refractive-Index Data

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Measurements of the refractive index n as a function of the temperature T provide an effective method for investigating the shape of coexistence curves in liquid-liquid phase transitions. To gain useful information from such measurements, experimental T - n data need to be converted into T - x and T - ρx data (where x and ρx stand for the mole fraction and partial density, respectively). For this purpose the Lorentz-Lorenz (LL) equation is commonly employed. The question arises how reliable are such LL-based procedures. Here we address this question by analyzing literature data of T - x and T - ρx for the coexistence curves of liquid mixtures in the framework of the concept of complete scaling to account for asymmetric criticality [1,2]. In particular, we develop specific fitting procedures which enable us to obtain reliable values for the two coefficients in the expressions for the scaling fields that are responsible for liquid-liquid asymmetry. We shall provide evidence that these asymmetry coefficients are related to the molecular volumes of the two liquid components [3].

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