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Sommario/riassunto

The investigation of the interfacial phase transitions in fluid systems with short-range intermetallic interactions are of great interest. The phenomena were studied in two systems exhibiting a liquid-liquid miscibility gap: at the fluid/wall interface in fluid KxKCl1-x and at the fluid/vacuum interface of the Ga1 xBix alloys. To characterize the interfacial changes of the ultra thin films (composition, thickness and their evolution with time) the spectroscopic ellipsometry was performed over a wide spectral range. Whereas in the experiments on KxKCl1-x an existing ellipsometer could be used, a completely new UHV-apparatus including the in-situ phase modulation ellipsometer had to be developed for Ga1 xBix alloys. For the KxKCl1-x system new results on complete wetting at solid-liquid coexistence as well as in the homogenous liquid phase (prewetting) are presented. The spectra show the typical F center absorption which indicates that the film is a salt-rich phase. The thickness strongly increases approaching the monotectic from 30 to 440 nm, which is in agreement with the tetra point wetting scenario. For this interpretation a quantitative description of the excess Gibbs energy has been developed. For the Ga1 xBix system the results on complete wetting, surface freezing and oscillatory interfacial instabilities are presented. The high-precision spectra have been recorded approaching the liquid-liquid miscibility. These spectra have been modeled using a Ga-Bi effective medium approximation for the substrate covered by a film of liquid Bi. The

measurements give evidence of tetra point wetting in the Ga-Bi system. First ellipsometric study of the surface freezing in Ga-Bi has been performed. Within the miscibility gap a very interesting effect of surface and bulk oscillatory instability was observed. The details of this process at present are not well understood, but a qualitative description is given.