Observation of heterogeneous nucleation in dilute ^{3}He-^{4}He mixtures

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Basing on the analysis of experimental data [1,2] we investigate the heterogeneous growth of a new phase in the ^{3}He-^{4}He mixtures at temperature below 300 mK. In [1,2] the supersaturation of superfluid solutions was achieved by various methods. In [1] one has used the dual chamber methodology that allows to change the concentration of the solution at a constant temperature and pressure. In [2] the method was applied of decompression, allowing a supersaturation, changing not only the pressure but also concentration. The temperature dependence and magnitude of supersaturation achievable in both experiments was different. In the papers [3,4] it was shown that the nucleation of a new, concentrated phase of ^{3}He can start on heterogeneous nucleation centers - quantized vortices. In present report we shows that the beginning of a new phase growth is not determined by the degree of supersaturation of the solution but by the values of its concentration, temperature and pressure. Taking into account the dependence of ^{3}He concentration on the line of separation on pressure and the degree of supersaturation obtained in [2], the magnitude of the absolute concentration and temperature in the experiments coincide, forming a curve in the phase diagram which in good agreement with the vortex spinodal, calculated in this paper.

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