

The Features of Liquid ^3He - ^4He Mixture Phase Diagram in Narrow Geometry

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The influence of van der Waals forces on the decay of liquid solutions of helium isotopes is studied theoretically and the conditions for the phase co-existence in a confined geometry are investigated. We consider the thermodynamics equilibrium conditions in presence of the field of van der Waals forces. As the models to account the influence of van der Waals forces on the helium isotope solution the gap between two parallel planes and the cylindrical channel are considered. For each of the models we calculated the concentration space profile inside the channel depending on the van der Waals constant, the initial solution concentration and the size of the channel. We modify the phase diagram of the solution in narrow geometry in comparison with that in bulk. A rather good agreement between theoretical and experimental phase diagrams is obtained for liquid helium mixture in aerogel with porosity $\lesssim 95\%$.