

Critical Overpressure for Nucleation of ^4He Crystals in Aerogel

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We are focusing on the crystallization of ^4He in aerogels intensively, motivated by the finding of the dynamical transition of the crystal growth inside the aerogels.¹ In the experiment with aerogels contained in a flat glass tube, we found that ^4He in the aerogel crystallized by nucleation.² In order to confirm this nucleation, we measured the critical overpressure at which the very first ^4He crystal appears in the aerogel. Crystallization and melting were repeated 50 times at a constant temperature in a variable volume cell and the nucleation probability as a function of overpressure was obtained. Anisotropic S shape characteristic to the nucleation process was successfully observed and the critical radius of the nucleated crystals was estimated. The S shape curve changes drastically through the dynamical transition temperature.

¹R. Nomura, A. Osawa, T. Mimori, K. Ueno, H. Kato and Y. Okuda, Phys. Rev. Lett. **101**, 175703 (2008).

²K. Ueno, R. Masumoto, T. Mimori, A. Osawa, R. Nomura and Y. Okuda, J. Low Temp. Phys. **158**, (2010).