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Thermal and quantum crystallizations of ^{4}He in aerogel RYUJI NOMURA, KEN-ICHI UENO, RYOTA MASUMOTO, YUICHI OKUDA, Tokyo Institute of Technology — The way of the crystallization of ^{4}He in aerogel was known to show a dynamical phase transition due to the competition between thermal fluctuation and disorder: crystals grow via creep at high temperatures and via avalanche at low temperatures (Phys. Rev. Lett. 101, 175703 (2008)). Here we report the growth velocity and the crystallization pressure of ^{4}He in both regions. In the creep region, crystal growth is faster at higher temperature and becomes slower with cooling. This is consistent with the expectation that crystal growth is via a thermally activated interface motion in the disordered media in the creep region. This temperature dependence is opposite to the bulk crystal growth. Growth velocity is the lowest at the transition temperature. In the avalanche region, it slightly increases with cooling and saturates at lower temperature. This temperature independent growth is presumably the result of the macroscopic quantum tunneling through the disorder. The crystallization pressure in aerogel is not just like a shift of the bulk crystallization pressure but has a maximum at the transition temperature.

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