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Partial depinning of dislocation in ^{4}He from ^{3}He impurities induced by thermal roughening[1] DARYA ALEINIKAVA, ANATOLY KUKLOV, College of Staten Island, CUNY — The mechanism of the roughening induced partial depinning of gliding dislocations from ^{3}He impurities is proposed [1] as an alternative to the standard "boiling off" scenario [2]. We give a strong argument that ^{3}He remains bound to dislocations even at large temperatures due to very long equilibration times. This conjecture is based on two observations: First, the experimental data [2] for shear modulus temperature dependence obtained at very different ^{3}He concentrations (1 ppb and 300 ppb) can be, practically, collapsed on each other by a simple rescaling of temperature; Second, both moduli can be fit by the Monte-Carlo simulations data within the assumption that the impurities remain confined to the spatial region occupied by dislocation. Conversely, impurities evaporation violates strongly the data collapse and is absolutely inconsistent with the simulations. We propose that such long equilibration time is due to the very narrow band of ^{3}He impuritons [3].

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