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Effect of ^{3}He impurity on the supersolid transition of ^{4}He E. KIM, Korea Advanced Institute of Science and Technology, J. S. XIA, University of Florida, J. T. WEST, X. LIN, M. H. W. CHAN, The Pennsylvania State University — The supersolid phase of ^{4}He was reported by a series of torsional oscillator experiments [1]. One of the most striking features of the supersolid transition is the intriguing ^{3}He impurity effect. The addition of an extremely small amount of ^{3}He impurity broadens the transition and enhances the transition temperature T_c. This effect is very different from that in helium film and that in 'bulk' superfluid helium. We have studied the influence of ^{3}He impurity on the supersolid transition systematically by progressively diluting isotopically-pure ^{4}He (^{3}He impurity less than 2ppb) with ^{3}He. The transition temperature is monotonically enhanced with increasing ^{3}He concentration and the supersolid fraction shows a broad maximum around 0.2 ppm. [1] E. Kim and M. H. W. Chan, *Science* **305**, 1941 (2004); *Nature* **425**, 227 (2004); *J. Low Temp. Phys.* **138**, 859 (2005); *Phys. Rev. Lett.* **97**, 115302 (2006).

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