

Abstract Submitted
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Suppression of phase separation and whole phase diagram in FeSe_{1-x}Te_x thin films on LaAlO₃ substrates¹ YOSHINORI IMAI, Dept. of Physics, Tohoku University, FUYUKI NABESHIMA, YUICHI SAWADA, DAISUKE ASAMI, MASATAKA KAWAI, ATSUTAKA MAEDA, Dept. of Basic science, the University of Tokyo — In FeSe_{1-x}Te_x, it is known that the phase separation occurs at $x = 0.1 - 0.4$ for bulk samples, and it prevents the complete understanding of this system. In previous meeting, we reported the fabrication of FeSe_{1-x}Te_x films on CaF₂ with with whole range of x by a pulsed laser deposition [1]. Surprisingly, the optimal composition was found in the phase-separation region; T_c reaches 23 K at $x = 0.2$. In this presentation, we report the successful fabrication of FeSe_{1-x}Te_x films with $x = 0 - 0.7$, which includes the phase-separation region, on LaAlO₃ substrates. The highest T_c of the films on LaAlO₃ substrates reaches 19 K, which is also higher than that of bulk samples. The doping-temperature ($x - T$) phase diagram of FeSe_{1-x}Te_x films clearly shows that T_c suddenly changes at the Te content where the structural transition disappears, which is commonly observed for both films on LaAlO₃ and CaF₂[2,3]. Our result indicates that one of the key factors to realize a further increase of T_c in iron chalcogenides is the control of the structural transition. [1] Y. Imai *et al.*, Proc. Natl. Acad. Sci. USA. 112 (2015) 1937. [2] Y. Sawada *et al.*, J. Phys. Soc. Jpn. 85 (2016) 073703. [3] Y. Imai *et al.*, *submitting*.

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