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Growth and superconductivity of $FeSe_x$ crystals[1] ZHILI XIAO*, UMESH PATEL*, SUHONG YU*, HELMUT CLAUS, VITALII VLASKO-VLASOV, SEVDA AVCI*, JOHN SCHLUETER, ULRICH WELP, WAI-KWONG KWOK, Argonne National Laboratory, *Northern Illinois University — Stimulated by the recent discovery of high temperature superconductivity in ferrous pnictides, other iron-based planar compounds have been revisited to search for superconductivity. The most promising outcome of this effort is the discovery of superconductivity in *alpha* - $FeSe_x$ which is less toxic but has a $FeSe_4$ tetrahedra planar crystal sublattice similar to that consisting $FeAs_4$ in the oxypnictides. Investigations on the superconductivity in $FeSe_x$ can shed light on the superconducting mechanism in oxypnictides. We report the growth of $FeSe_x$ crystals through a vapor self-transport approach. Both tetragonal and hexagon shaped $FeSe_x$ crystals with a lateral dimension of up to a few millimeters were obtained and their superconductivity was investigated with both magnetization and resistive measurements. We systematically explored the effect of synthesis parameters such as Fe/Se ratio, sintering temperature and cooling rate on the quality of the crystals.

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