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Crystal growth and superconductivity of new Fe-Te base materials[1] GENDA GU, CMP&MS, Brookhaven National Laboratory, NY 11973, USA, JINSHENG WEN, ZHIJUN XU, Z.W. LIN, QIANG LI, J.M. TRANQUADA, CMP&MS, BNL, CMP&MS, BNL TEAM — A number of Fe-base superconducting materials with critical superconducting temperature up to 56K have been discovered recently. Because As and its oxide of the Fe-As base superconducting materials is poison, it is a serious safety issue for researchers to make the bulk materials. The new Fe-Te base superconducting materials with Se doping are less toxic and safe to handle. We have grown a number of the $FeTe_{1-x}Se_x$ single crystals (x = 0∼0.5) by using a modified floating-zone growth technique. The effects of the growth condition and the composition of a feed rod on the single crystal growth of $FeTe_{1-x}Se_x$ have been studied by using a floating zone machine. The single crystals of the PbO-type tetragonal structure $FeTe_{1-y}Fe_y$ (y = 0.04 to 0.08) are not superconducting. When Se substitutes for Te in $FeTe_{1-x}Se_x$ single crystals, the superconducting transition temperature increases with increasing Se content.

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