

Single crystal growth and physical properties of $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$

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Sizable platelet single crystals of $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ covering wide K concentrations were grown using a self-flux method. A newly-developed encapsulation technique using commercial stainless steel container allowed the stable crystal growth lasting for more than 2 weeks. For the growth of KFe_2As_2 , ternary K-Fe-As systems with various starting compositions were examined in order to determine the optimal growth conditions. Employment of KAs flux led to the growth of large single crystals with the typical size of as large as 15 x 10 x 0.4mm. ¹ The grown crystals exhibit sharp superconducting transition at 3.5K with the transition width 0.2K, as well as the very large residual resistivity ratio reaching 450, evidencing the high sample quality. For $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$, we find that mixture of Ba-As and K-As flux is also useful for synthesizing large single crystal samples. The superconducting and normal state properties of the grown crystals will be presented.

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