Abstract Submitted
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Flux Growth of Large Single Crystals of YFe_2Al_{10} by Nucleation Site Reduction[1] JEDEDIAH KISTNER-MORRIS, LIUSOU WU, WILLIAM GANNON, MEIGAN ARONSON, Department of Physics and Astronomy, Stony Brook University, Stony Brook, New York 11794-3800, USA — The metallic d-electron compound YFe_2Al_{10} is near a quantum critical point. Large single crystals of this compound are required for inelastic neutron scattering experiments. We synthesized high quality single crystals via aluminum flux growth. A number of adjustments to the growth procedure were required to optimize crystal quality and size. First, the cooling rate of the flux growth was adjusted to produce a thermodynamically favorable environment for YFe_2Al_{10} growth, which was found to grow around 920°C. Second, initial composition of the growths were then optimized to avoid the growth of the binary phases, YAl_3 and Fe_4Al_{13}, as well as to maximize crystal size and reduce site nucleation. Third, site nucleation was further reduced by polishing the alumina growth crucibles with sandpaper and then etching them with aqua regia. The result after optimization is that individual growths produced three to five polyhedral crystals with single facets up to 9mm in width, and mass of about 700mg. The implemented nucleation site reduction techniques can be applied to other flux systems to increase crystal size and mass.

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