Magnetic and Transport Study of Single Crystal SrRu$_{1-x}$Cr$_x$O$_3$ with Increased Curie Temperature

G. CAO, V. DURAI RAJ, E. ELHAMI, X.N. LIN, S. CHIKARA, Department of Physics and Astronomy, University of Kentucky, Lexington, KY40506, USA — We report results of a structural, magnetic and transport study of single crystal SrRu$_{1-x}$Cr$_x$O$_3$ ($0 \leq x < 0.15$), i.e., Cr doped SrRuO$_3$. Unlike other impurity doping (such as Ca, Mn, Fe), the Cr doping systematically enhances the Curie temperature from $T_c=165$ K for $x=0$ to $T_c=190$ K for $x=0.13$. In the meantime, the Cr doping also significantly increases the saturation moment from 1.1 for $x=0$ to as large as 1.5 Bohr magneton/Ru for $x>0$. The system stays itinerant for the entire doping range with resistivity showing the Fisher-Langer behavior at $T_c$. Magnetic anisotropy and negative magnetoresistance are also observed. All results will be presented and discussed along with comparisons with other related systems.

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