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Title:	Crystal growth and magnetic anisotropy in the spin-chain ruthenate Na_2RuO_4
Authors:	Balodhi, A. (/jspui/browse?type=author&value=Balodhi%2C+A.) Singh, Yogesh (/jspui/browse?type=author&value=Singh%2C+Yogesh)
Keywords:	Magnetic anisotropy Antiferromagnetism Crystal growth Paramagnetic contribution
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Abstract:	We report single-crystal growth, electrical resistivity ρ , anisotropic magnetic susceptibility χ , and heat capacity C_p measurements on the one-dimensional spin-chain ruthenate Na_2RuO_4 . We observe variable range hopping (VRH) behavior in $\rho(T)$. The magnetic susceptibility with magnetic field perpendicular (χ_\perp) and parallel (χ_\parallel) to the spin chains is reported. The magnetic properties are anisotropic with $\chi_\perp > \chi_\parallel$ in the temperature range of measurements $T \approx 2\text{--}305$ K with $\chi_\perp/\chi_\parallel \approx 1.4$ at 305 K. From an analysis of the $\chi(T)$ data we attempt to estimate the anisotropy in the g factor and Van Vleck paramagnetic contribution. An anomaly in $\chi(T)$ and a corresponding step-like anomaly in C_p at $T_N \approx 37$ K confirms long-range antiferromagnetic ordering. This temperature is an order of magnitude smaller than the Weiss temperature $\theta \approx 250$ K and points to suppression of long-range magnetic order due to low dimensionality. A fit of the experimental $\chi(T)$ by a one-dimensional spin-chain model gave an estimate of the intrachain exchange interaction $2J \approx 85$ K and the magnitude of the interchain coupling $ 2J_\perp \approx 3$ K.
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