Abstract Submitted
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Antiferromagnetic Metallic State And Spin Valve Effect in Doped $(Ca_{1-x}\ A_x)_3Ru_2O_7$ (A = Sr, Ba) Single Crystals[1] S. CHIKARA, O.B. KORNETA, T.F. QI, S. PARKIN, G. CAO, Univ. of Kentucky, W.P. SONG, Inst. of Solid State Physics, Hefei 230031, P.R. China, W.P. CRUMMETT, Centre College, KY40422 — Bilayered $Ca_3Ru_2O_7$ is a highly anisotropic system [1] characterized by orbitally-driven colossal magnetoresistance[2] and an unusual antiferromagnetic metallic (AFM-M) state [2]. We report transport and thermodynamic properties of $(Ca_{1-x}\ A_x)_3Ru_2O_7$ (A = Sr, Ba) single crystals as a function of temperature and applied magnetic field. While Ba doping shows a far stronger impact, both Sr and Ba substitution for Ca induce a large array of interesting phenomena. Among them, a bulk spin-valve effect occurs in the AFM-M range, which is largely broadened due to the doping. This effect in bulk crystals is a novel phenomenon first observed in $Ca_3(Ru_{1-x}Cr_x)_2O_7$ single crystals [3]. The spin-valve effect in $(Ca_{1-x}A_x)_3Ru_2O_7$ single crystals opens new avenues to understand the underlying physics and realize the potential of spin valves in practical devices.
[1] G. Cao et al., *PRL* **78**, 1751 (1997)
[2] X. N. Lin et al., *PRL* **95**, 017203 (2005)
[3] G. Cao et al., *PRL* **100**, 016604 (2008)

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