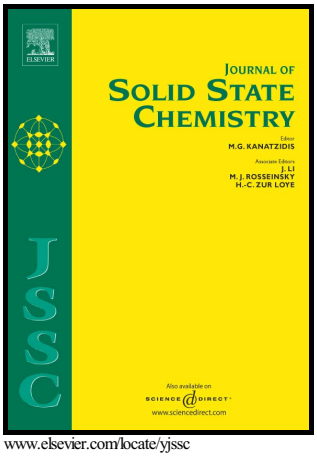

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An Investigation of the Electronic, Structural and Magnetic Properties of the Ruddlesden-Popper Phase Sr_3RuCoO_7

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Abstract

The structural, magnetic and electronic properties of the Ruddlesden-Popper material Sr_3CoRuO_7 have been investigated. Examination of the dc and ac magnetic susceptibility demonstrates that Sr_3CoRuO_7 exhibits a spin glass transition at 40 K and a magnetic transition at 140 K. Variable-temperature neutron powder diffraction experiments showed no evidence of magnetic diffraction peaks down to 5 K. This suggests the transition at 140 K is a result of short range magnetic order or magnetic clustering of the Co/Ru spins. Sr_3CoRuO_7 is semiconducting and Mott variable range hopping behaviour is observed below 240 K.

Graphical abstract

Short range antiferromagnetic order is observed below ~ 140 K in Sr_3CoRuO_7 followed by spin glass behaviour at 40 K.

Keywords: Antiferromagnet; crystal structure; Ruddlesden Popper; neutron; diffraction; spin glass