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Anomalous electronic state in $CaCrO_3$ and $SrCrO_3$ J.-S. ZHOU, J.B. GOODENOUGH, Texas Materials Institute, University of Texas at Austin, Y.W LONG, C.-Q. JIN, Institute of Physics, Chinese Academy of Science, P.R. China — Measurements of thermal conductivity, thermoelectric power, electrical conductivity, magnetization and the equation of state have been carried out on ceramic samples of $CaCrO_3$ and $SrCrO_3$ that were synthesized under high pressure. Contrary to earlier reports, both compounds have been found to be a spin-glass insulator. While the magnetic susceptibility χ(T) of $SrCrO_3$ becomes completely incompatible with the Curie-Weiss law, the μ_{eff}=3.4 μ_B obtained in $CaCrO_3$ is close to the spin-only moment of a localized electronic state. Suppression of the thermal conductivity in both compounds indicates that orbital fluctuations are present, which confirms further the "localized" electronic state. Factors such as a higher κ(T) and weaker temperature dependence of χ(T) for $SrCrO_3$ than $CaCrO_3$ suggest that $SrCrO_3$ is close to the crossover from the localized to the itinerant electronic state. More importantly, the Cr-O bond length in $SrCrO_3$ is much smaller than that calculated from the ionic radii. An anomalous small bulk modulus found for $SrCrO_3$ at P $>$ 40 kbar confirms unambiguously that the electronic state transition is induced under high pressure. The bulk modulus of $SrCrO_3$ below 40 kbar and $CaCrO_3$ falls in line with other perovskite oxides.

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