Syntheses, Crystal Structures and Magnetic Properties of $\rm Rb_2RuO_4$ and $\rm K_2RuO_4$

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Potassium and rubidium oxoruthenates, A₂RuO₄, were synthesized from the alkali peroxides/hyperoxides and ruthenium dioxide. Both compounds crystallize in the orthorhombic space group *Pnma* (no. 62), (K₂RuO₄: a = 7.673(2), b = 6.153(2) and c = 10.564(3) Å, Z = 4, 796 unique reflections, R = 3.5%; Rb₂RuO₄: a = 8.106(2), b = 6.270(1) and c = 11.039(2) Å, Z = 4, 889 unique reflections, R = 3.6%). The crystal structures, as determined from single crystal data, are of the β -K₂SO₄ type. Magnetic measurements reveal that both compounds are paramagnetic down to temperatures of around 60 K and further exhibit antiferromagnetic transitions, at around $T_N = 9$ K for Rb₂RuO₄, and two transitions with $T_N = 14$ K and 4 K for K₂RuO₄. The magnetic moments as determined applying Curie-Weiss law for both compounds are 2.68 μ_B , thus confirming the oxidation state +6 of ruthenium.

Key words: Potassium and Rubidium Oxoruthenates, Ruthenium, Crystal Structure, Magnetic Properties