Supplemental material to the article "Anomalies of the Electronic Structure and Physical Properties of Rare Earth Cobaltites in the Vicinity of Spin Crossover"

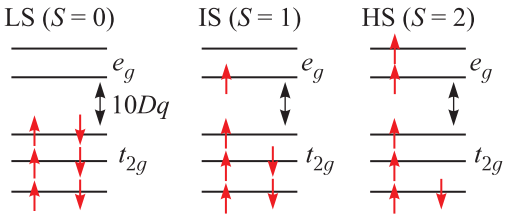

Figure 1: Possible spin states of Co^{3+} ion

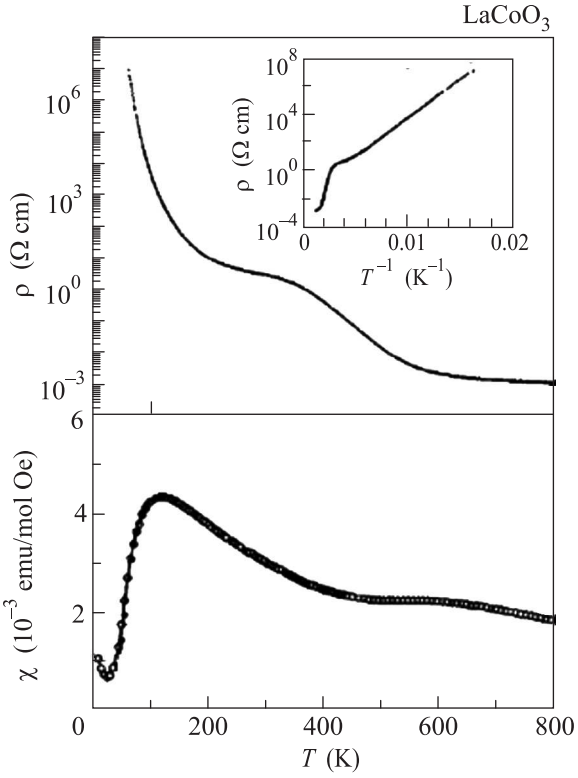

Figure 2: Temperature dependence of the resistivity (upper panel) and magnetic susceptibility (lower panel) of $LaCoO_3$ [9]

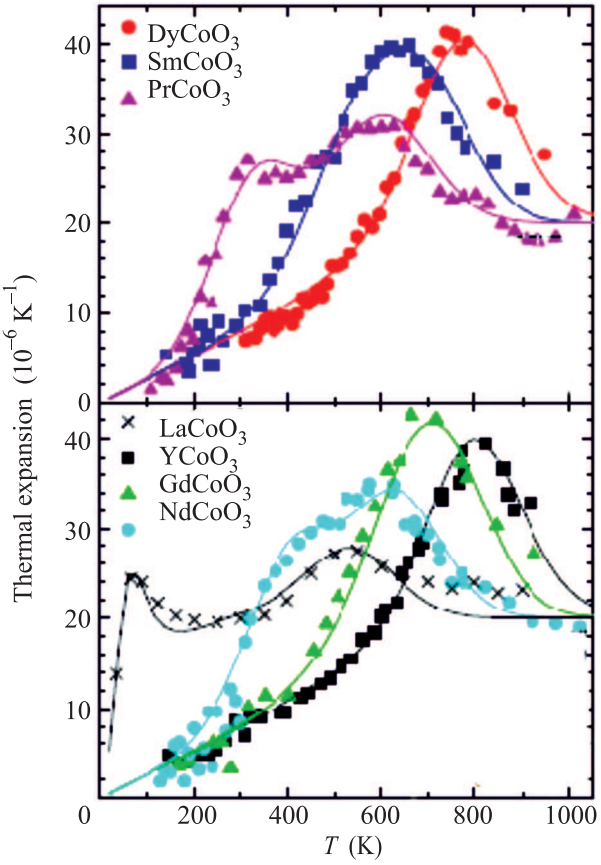

Figure 3: The coefficient of linear thermal expansion α of $LnCoO_3$ [32]

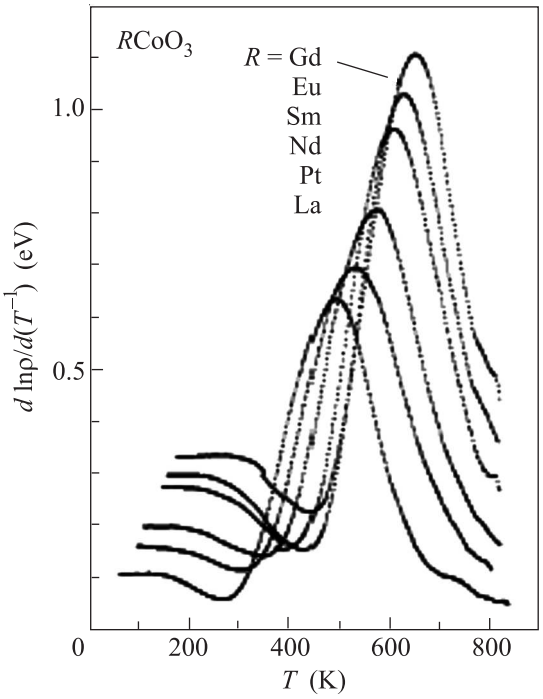

Figure 4: The dependence of $d\ln p/d(T^{-1})$ versus temperature for $LnCoO_3$ series [31]

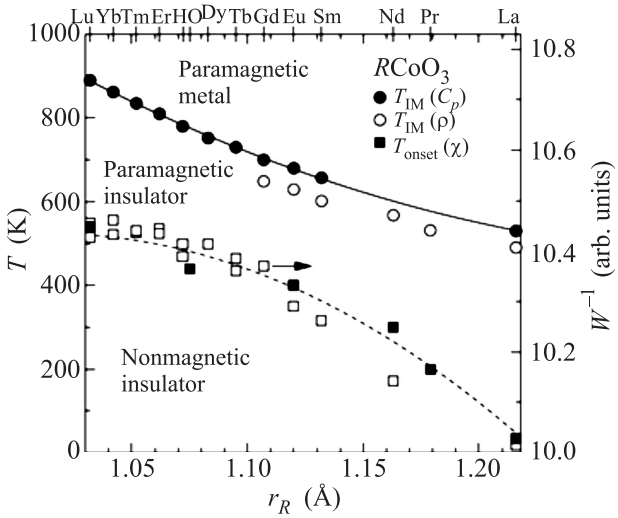

Figure 5: Electronic phase diagram for $LnCoO_3$ as a function of the ionic radius [34]

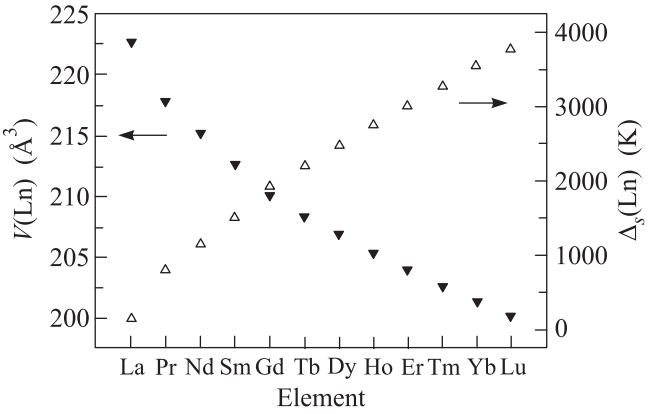

Figure 6: The unit cell volume (black triangles) and the magnitude of the spin gap (white triangles) for a number of rare earth elements [5]

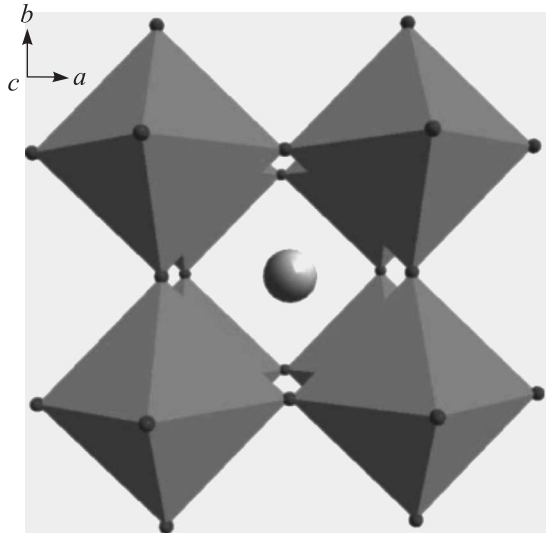

Figure 7: The ideal cubic perovskite structure $LnCoO_3$ [8]

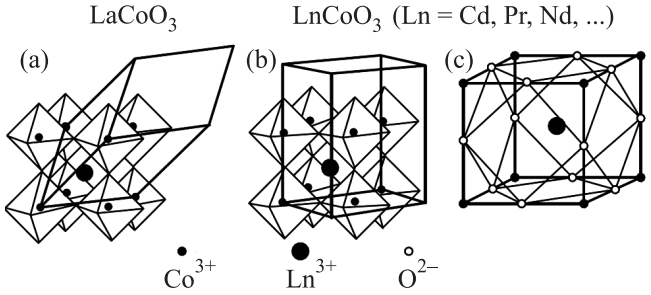

Figure 8: The perovskite crystal structure of $LnCoO_3$. (a) – With rhombohedral distortion (group $R3^-$ c for Ln = La). (b) – With rhombic distortion (group *Pbnm* for Ln ≠ La). (c) – The environment of the rare earth ion [7]

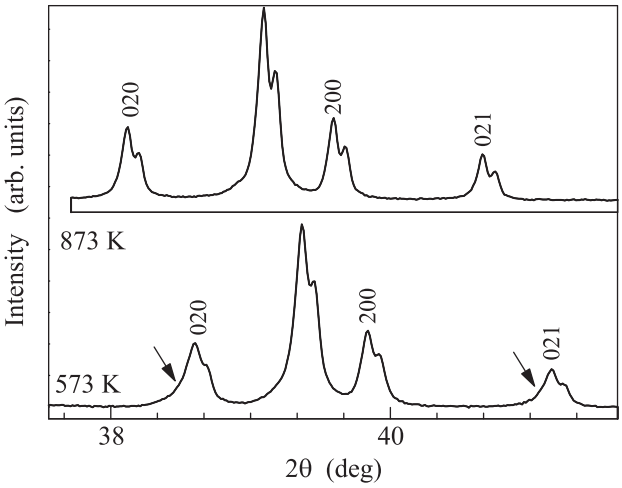

Figure 9: The characteristic fragments of the diffraction patterns at 573 and 873 K. The asymmetric broadening of the peaks for the 573 K is shown by arrows. For a temperature of 873 K asymmetry is absent

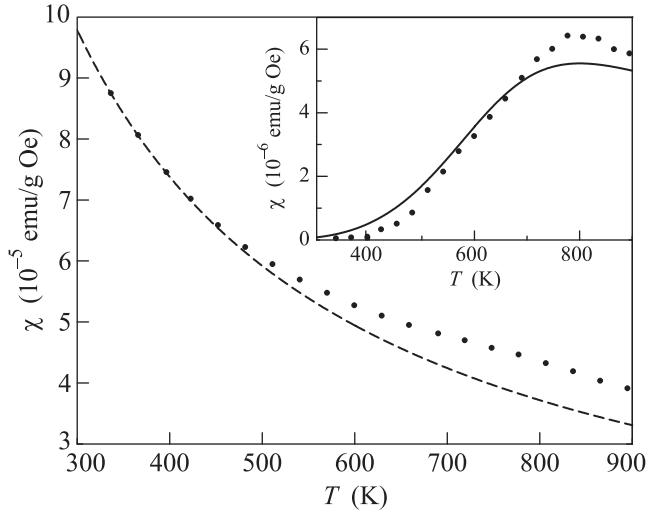

Figure 10: Temperature dependence of the magnetic susceptibility of $GdCoO_3$ (points) and Gd^+ ions contribution, calculated by the Curie–Weiss law. The inset shows Co^{3+} ions contribution (points – the difference between the experimental data and the gadolinium ions contribution, the solid line – the results of the theoretical calculation)

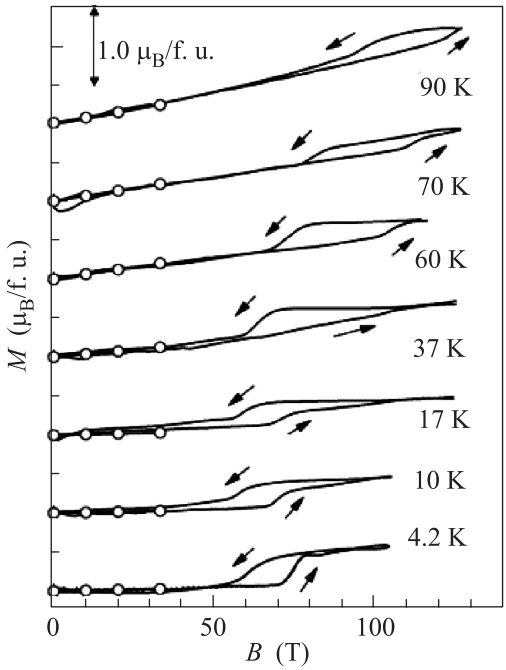

Figure 11: Field dependence of magnetization $LaCoO_3$ at different temperatures [50]

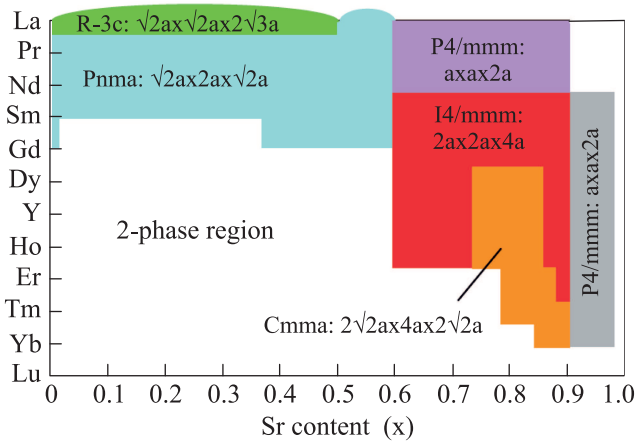

Figure 12: The phase diagram of perovskite structure at 300 K [64]