$R\mathrm{BaCo_2O_{5.5}}$ (R = Y, Gd, and Tb) – thermal properties and phase transition

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Layered cobaltites $R\mathrm{BaCo_2O_{5.5}}$, show numerous intriguing properties, e.g., large O_2 ionic conductivity, appearance of Co ions in different spin states, and several phase transitions of different nature. Comparative specific heat studies, aimed at explaining an influence of different rare-earth ions on thermal properties of these compounds and on the phase transitions appearing in them, were performed for the compositions with R being: Y (nonmagnetic), Gd (magnetic but not influenced by crystalline field, CEF), and Tb (magnetic and strongly influenced by CEF). The studies were performed over the temperature range 3 - 395 K, in the magnetic field up to 9 T. Lattice, magnon, and Schottky contributions to the specific heat were separated and described theoretically. The molecular field corresponding to the R–Co exchange interactions was estimated to be $\sim$1 T.

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