Electronic Structure and Magnetic Properties of $(\mathbf{Y}_{1-x}\mathbf{Gd}_x)_{n+1}\mathbf{Co}_{3n+5}\mathbf{B}_{2n}$

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9.7 cm

Magnetic measurements, in the temperature range 4.2-1000 K, and band structure calculations were performed on $(\mathrm{Y}_{1-x}\mathrm{Gd}_x)_{n+1}\mathrm{Co}_{3n+5}\mathrm{B}_{2n}$ compounds with n=0; 1; 2; 3 and ∞. The experimental magnetic moments per formula unit are well described by the computed values. The substitution of Y by Gd increases gradually the magnetic moments on cobalt sites. In addition, the polarizations of Y ($4d$) and Gd ($5d$) bands increase. The $4f$-$5d$-$3d$ and $4d$-$3d$ exchange interactions are analyzed. Starting from the position of the center of gravity of Co ($3d$) bands, a model is proposed in order to take into account their magnetic moments in correlation with their local environments.

13.4 cm

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