

EPJ Web of Conferences 2016 vol.132

Phase transitions and exchange interactions in the $\text{SmCr}_3(\text{BO}_3)_4$ crystal

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Abstract

© The Authors, published by EDP Sciences. Spectroscopic investigation and specific heat and magnetic susceptibility measurements of $\text{SmCr}_3(\text{BO}_3)_4$ crystals were performed. The spectra of the Sm^{3+} and Cr^{3+} ions in samarium chromium borate were calculated and parameters of the exchange interactions between the nearest chromium ions, chromium and samarium ions were determined. Three phase transitions were observed at the temperatures $T_1 = 7.8 \pm 0.5$ K, $T_2 = 6.7 \pm 0.5$ K, and $T_3 = 4.3 \pm 0.2$ K, their nature is discussed. The crystal structures with different space symmetry groups $R\bar{3}2$ and $C2/c$ were found to coexist in $\text{SmCr}_3(\text{BO}_3)_4$ single crystal.

<http://dx.doi.org/10.1051/epjconf/201713202008>
