

The crystal field interaction at the rare earth site in ErNiAl₄

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Corrigendum

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B Saensunon, G A Stewart, P C M Gubbens,
W D Hutchison and A Buchsteiner
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The authors sincerely thank Cz Rudowicz for identifying incorrect heading assignments for three of the columns in table 1. After equation (2), there is also a value of 0.0101 attributed to θ_2 . This should be changed to 0.00254. Neither of these typographical errors influenced the final outcomes, which were arrived at for the correct headings and the correct θ_2 value. However, the authors have since noticed a further, more significant error whereby equation (2) was applied incorrectly to yield B_2^0 and B_2^2 values of the wrong sign. The corrected signs of B_2^0 and B_2^2 and the corresponding B_4^0 and B_6^0 values that resulted from new grid searches are now listed below in a corrected version of table 1. When these six revised sets of crystal field (CF) parameters are used to simulate the 8.6 K inelastic neutron scattering (INS) spectrum, it is now the set corresponding to $(x, y, z)_{\text{EFG}} \parallel (x, -z, y)_{\text{CF}}$ that provides a close description of similar quality to that of the existing figure 5. It is interesting that this new set of CF parameters is broadly similar in sign and magnitude to that reported in the existing publication. Another outcome is that the overall splitting of the tentative CF scheme predicted for the $J = 15/2$ ground state of Er³⁺ in ErNiAl₄ is increased from ≈ 28 meV to ≈ 40 meV. The exact arrangement of the upper levels of the CF scheme will be determined only when further INS spectra are recorded with increased incident neutron beam energy.

Table 1. CF parameters fitted to the first three excited CF level energies for Er³⁺ in ErNiAl₄. B_2^0 and B_2^2 were fixed at possible conversions from ¹⁵⁵Gd-Mössbauer data for GdNiAl₄ and B_4^0 and B_6^0 were fitted (assuming point charge model estimates of $r_4^2 = -3.73$, $r_4^4 = -3.97$, $r_6^2 = -5.06$, $r_6^4 = -26.0$, $r_6^6 = -29.9$ ($r_n^m = B_n^m/B_n^0$ —refer to the text for details)).

	$(x, y, z)_{\text{EFG}} \parallel$	$(y, z, x)_{\text{CF}}$	$(x, -z, y)_{\text{CF}}$	$(z, x, y)_{\text{CF}}$	$(z, -y, x)_{\text{CF}}$	$(-y, x, z)_{\text{CF}}$	$(x, y, z)_{\text{CF}}$
B_2^0 (K)		0.432	0.432	0.199	0.199	-0.631	-0.631
B_2^2 (K)		-0.829	0.829	1.065	-1.065	0.233	-0.233
B_4^0 (mK)		-3.468	-6.830	4.884	1.098	4.758	3.286
B_6^0 (μ K)		-10.44	-27.28	23.74	21.14	15.41	17.28