Electronic Supplementary Material (ESI) for Dalton Transactions.

Supplementary Material

for

Structural and magnetic properties of some lanthanide (Ln= Eu(III), Gd(III) and Nd(III)) cyanoacetate polymers: Field-induced slow magnetic relaxation in the Gd and Nd substitutions.

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S1. Coordination environment of Ln ions

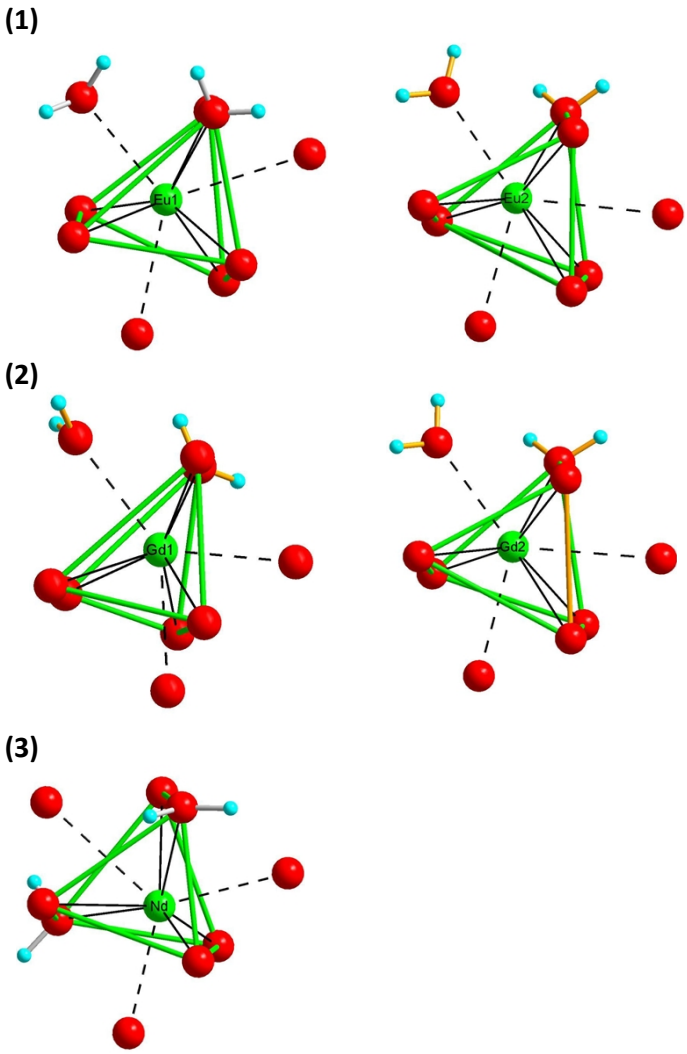


Fig. S.1. Tri-capped trigonal prism coordination environment for the lanthanide atoms in complexes: (**1**) with two different sites for Eu, (**2**) with two different Gd sites and (**3**) with a single Nd site.

S2. Relaxation Cole-Cole plots

The complex susceptibility data, showing evidence of two relaxational processes, have been fitted with a double Debye function:

$$\chi = \chi_s + \frac{\chi_1 - \chi_s}{1 + (i\omega\tau_1)^{1-\alpha_1}} + \frac{\chi_2 - \chi_1}{1 + (i\omega\tau_2)^{1-\alpha_2}},$$

, where χ_s is the adiabatic susceptibility, χ_1, χ_2 are the isothermal susceptibilities, τ_1 and τ_2 denote the median relaxation times of the two processes, and α_1, α_2 determine the width of the distribution of relaxation times ($0 < \alpha < 1$; $\alpha=0$ indicates an infinitely narrow distribution, whereas $\alpha=1$ indicates a very wide distribution).

The theoretical Cole-Cole plots are found depicting the fitted $\chi''(f)$ *vs*. $\chi'(f)$.

Gd complex (2)

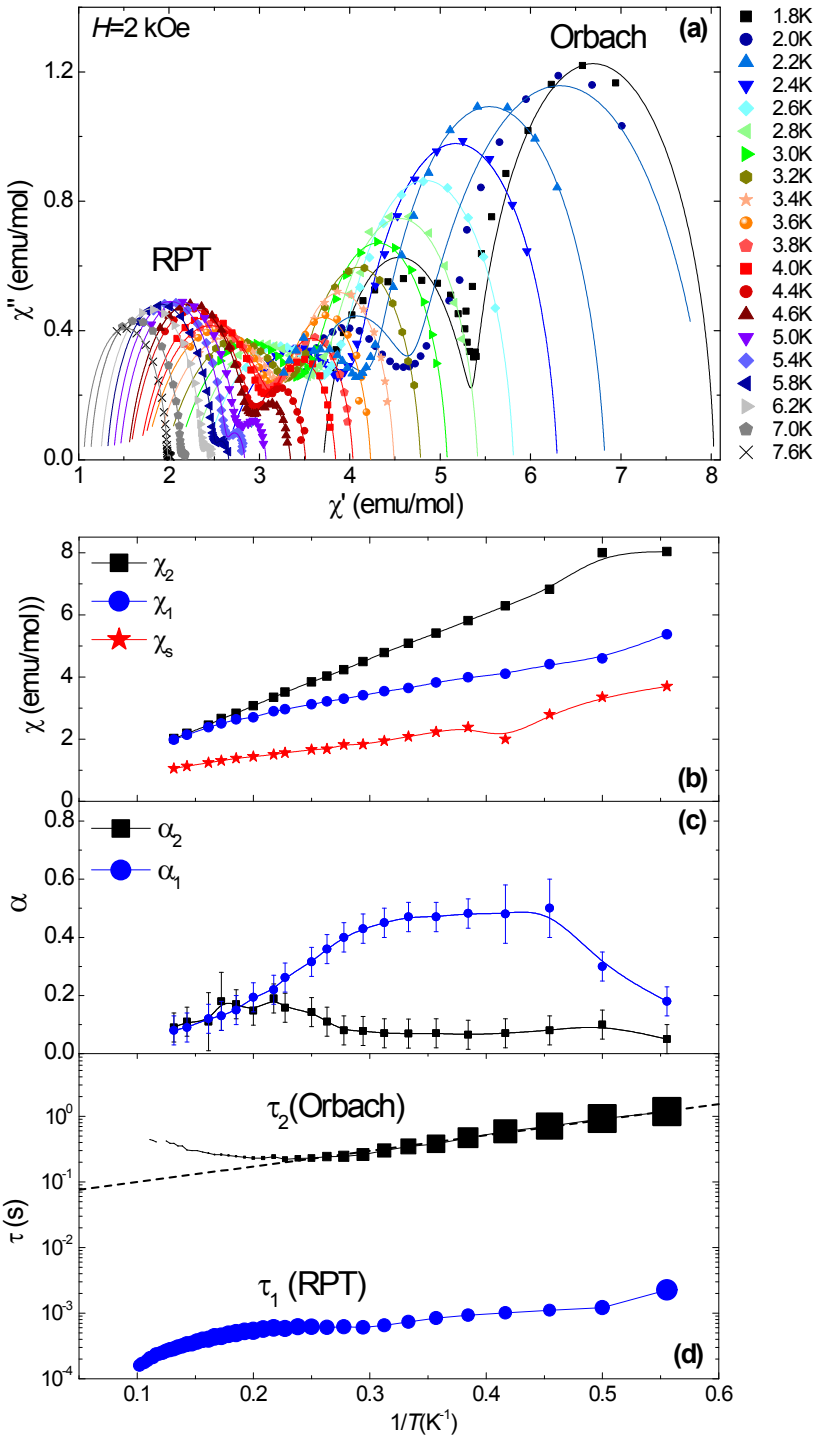


Figure S.2. Gd complex **(2)**: (a) Cole-cole $\chi''(\chi')$ experimental data at H=2.0 kOe and different temperatures between T=1.8 K – 7.6 K (some raw data have been omitted for the sake of clarity), and fits to Eq. [S.1], using the parameters: (b) χ_s, χ_1, χ_2, (c) α_1, α_2 and (d) τ_1 (RPT), τ_2 (Orbach).

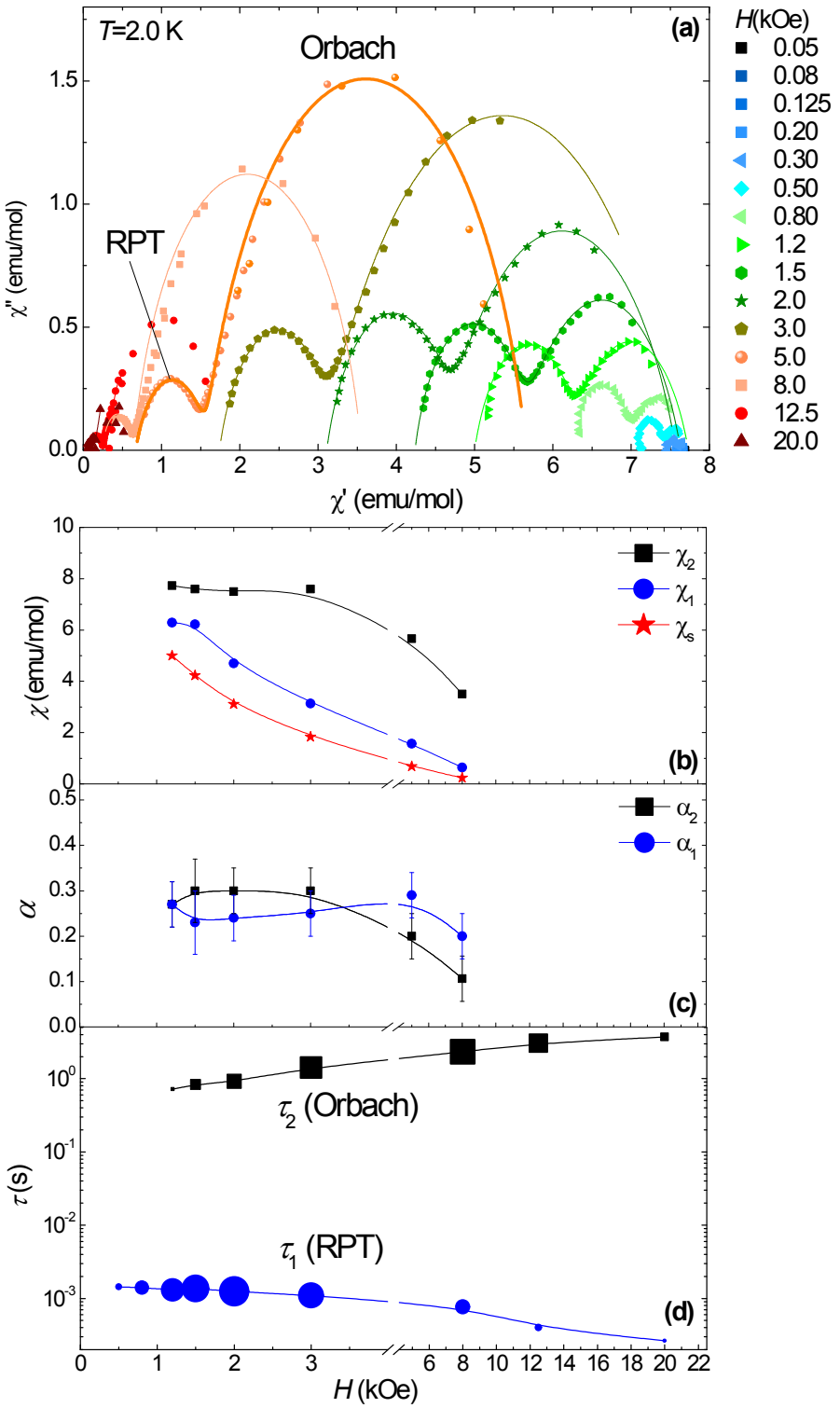


Figure S.3. Gd complex **(2)**: (a) Cole-cole χ''(χ') experimental data at T=2.0 K and different applied fields between H=0.05 and 8 kOe (some raw data have been omitted for the sake of clarity), and fits to Eq. [S.1], using the parameters: (b) χ_s, χ_1, χ_2, (c) α_1, α_2 and (d) τ_1 (RPT), τ_2 (Orbach).

Nd complex (3)

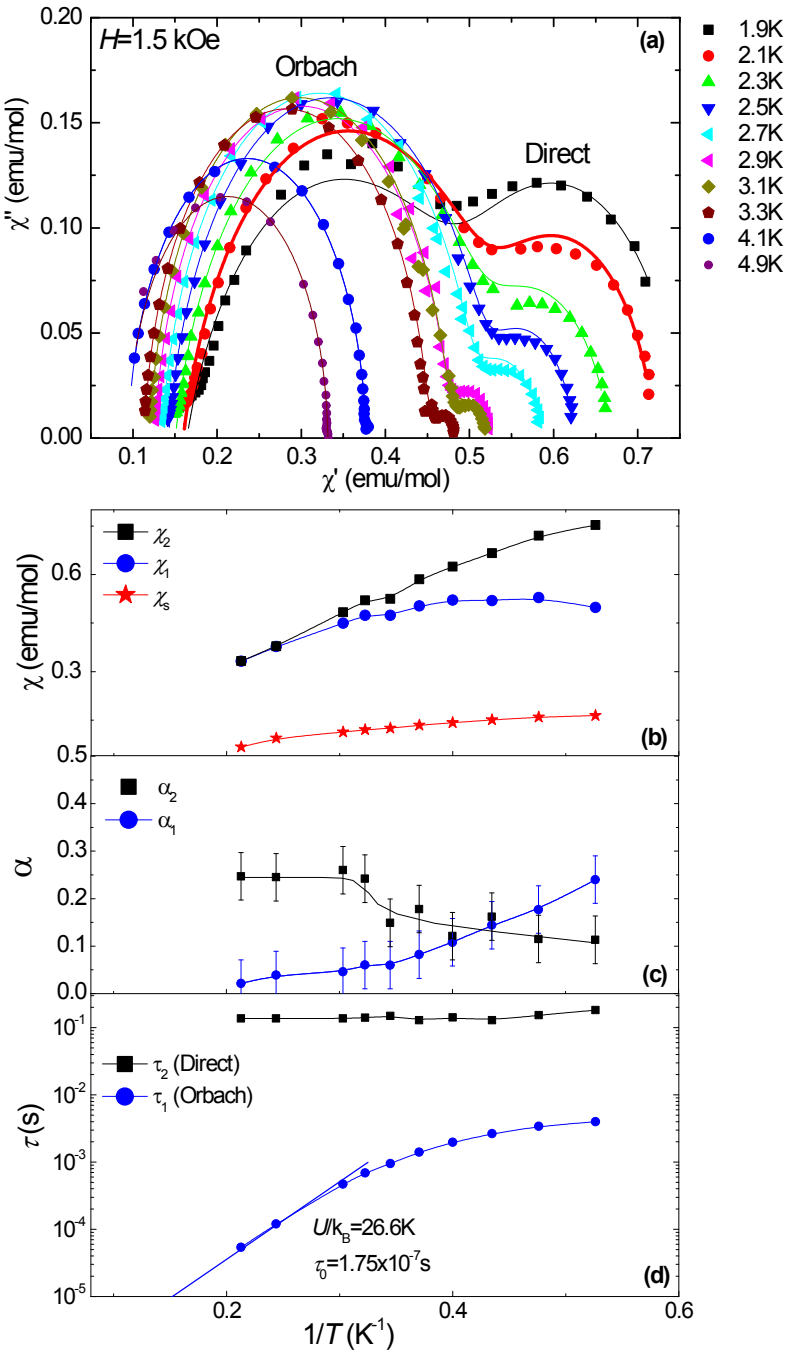
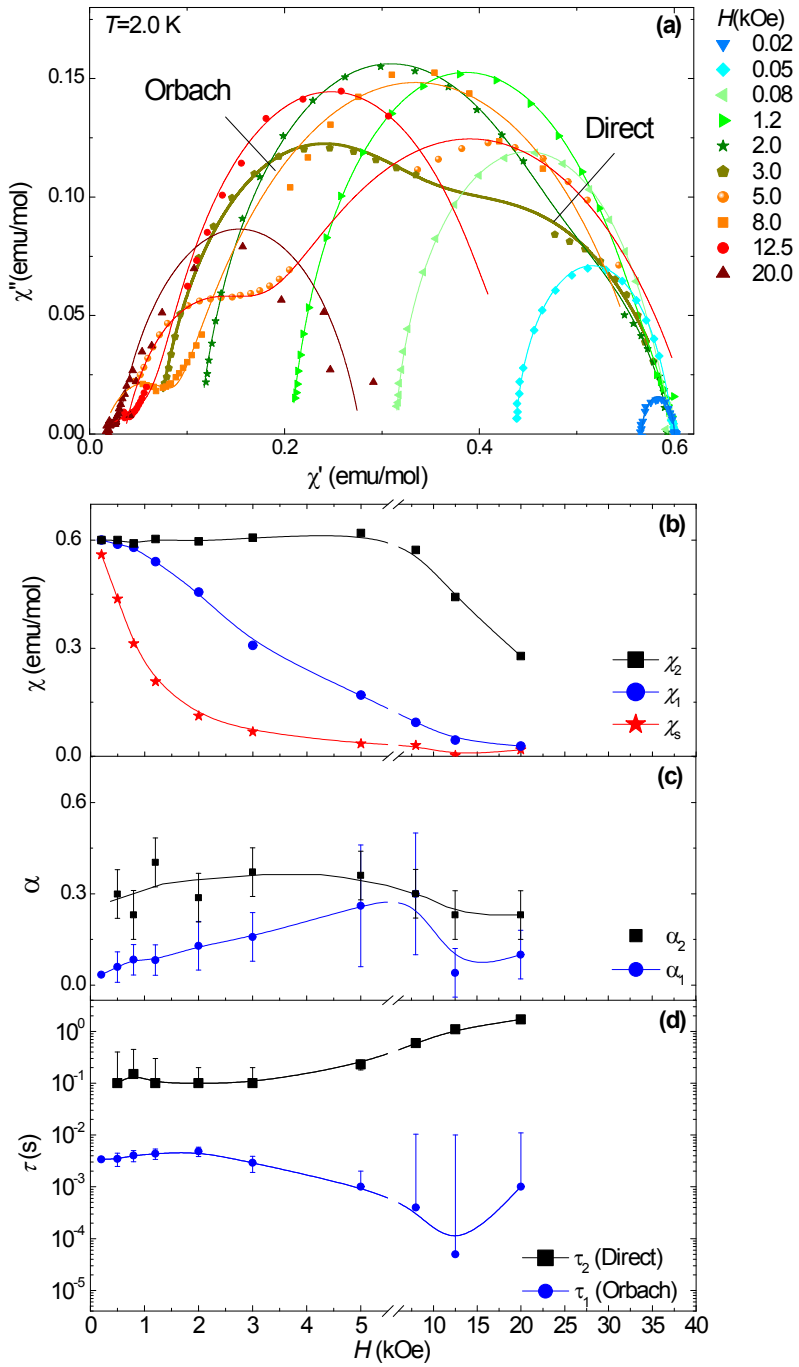


Figure S.4. Nd complex **(3)**: (a) Cole-cole χ''(χ') experimental data at H=1.5 kOe and different temperatures between T=1.9 K - 4.7 K (some raw data have been omitted for the sake of clarity), and fits to Eq. [S.1], using the parameters: (b) χ_s, χ_1, χ_2, (c) α_1, α_2 and (d) τ_1 (Orbach), τ_2 (direct process).



5 **Figure S.5.** Nd complex **(3)**: (a) Cole-cole χ''(χ') experimental data at T=1.2 K and different applied fields between H=0.02 and 2 kOe (some raw data have been omitted for the sake of clarity), and fits to Eq. [S.1], using the parameters: (b) χ_s, χ_1, χ_2, (c) α_1, α_2 and (d) τ_1 (Orbach), τ_2 (direct process).

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