x	1 ‰	5 ‰	1 %	5 %
$B_0 = 0.13$ T	5.7 10^4	8.1 10^4	4.6 10^5	1.2 10^6
$B_0 = 0.24$ T	3.3 10^4	1.1 10^5	3.4 10^5	8.1 10^6

Table 1-SI. Coefficient (in $s^{-1}K^{-1}$) of the linear fit of the variation of $\sqrt{\rho_1 \rho_2}$ with temperature in $La_{1\text{-}x}Gd_xPO_4$ for four gadolinium concentrations and two measuring fields.

T (K)	12	15	20	30
B_2 (mT)	~ 0.1	0.6	3	18
ρ_2 (s^{-1})	~ 6.5 10^6	3.8 10^7	1.9 10^8	1.15 10^9
τ_2 (ns)	~ 160	26	5.3	0.89

Table 2-SI. Temperature broadening of the ESR line of $LaPO_4$:Nd 1‰ determined by fitting the lines by the convolution of the 8 K line by a Lorentzian line of width B_2. The transverse relaxation rate (ρ_2) and time (τ_2) are related to the broadening width B_2 by $\rho_2 = 1/\tau_2 = \gamma_{\mathrm{Nd}} B_2$.

T (K)	4.6	5.5	8.0	10.0	12.0
B_s (mT)	6 10^{-4}	1.2 10^{-3}	0.010	0.047	0.084
$\sqrt{\rho_1 \rho_2}$ (s^{-1})	3.9 10^4	7.3 10^4	6.4 10^5	3.0 10^6	5.3 10^6
$\sqrt{\tau_1 \tau_2}$ (ns)	2.6 10^4	1.4 10^4	1.6 10^3	330	190

Table 3-SI. Saturation of the ESR line of $LaPO_4$:Nd 1‰. The saturation field B_s is determined by fitting the variation of the intensity of the ESR signal at 0.23 T as a function of the microwave power using Eq. (1). The longitudinal and transverse relaxation rates (ρ_1, ρ_2) and times (τ_1, τ_2) are related to B_s by $\sqrt{\rho_1 \rho_2} = 1/\sqrt{\tau_1 \tau_2} = \gamma_{\mathrm{Nd}} B_s$.

Figure Caption

Figure 1-SI. Variation of the ^{31}P NMR signal intensity without MAS rotation in $La_{1-x}Nd_xPO_4$ for x varying from 0 to 10%. The broken line is the linear adjustment.

Figure 2-SI. Details of the ESR spectra of $LaPO_4$:Gd at 20 K and 30 dB for three Gd^{3+} concentrations: 1‰ (a), 1% (b) and 5% (c). The 1% and 5% spectra were fitted (broken red lines) by the convolution of the 1‰ spectrum with Lorentzian lines 2.5 mT and 16 mT linewidths, respectively.

Figure 3-SI. (a) Temperature variation of the main part of the ESR spectrum of $La_{0.999}Nd_{0.001}PO_4$ at 20 dB. (b) Fit of the 20 K spectrum by the convolution of the 8 K spectrum with a lorentzian line of 3 mT linewidth.

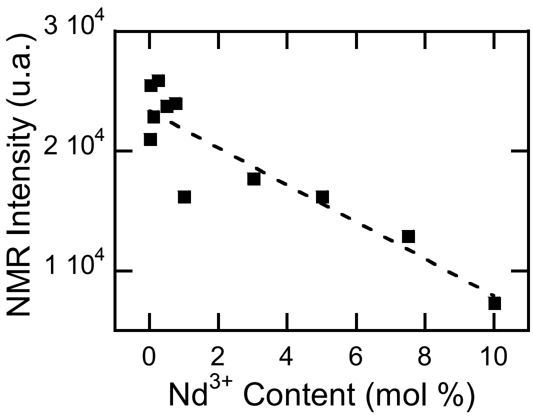

Figure 1-SI. Variation of the ^{31}P NMR signal intensity without MAS rotation in $La_{1-x}Nd_xPO_4$ for x varying from 0 to 10%. The broken line is the linear adjustment.

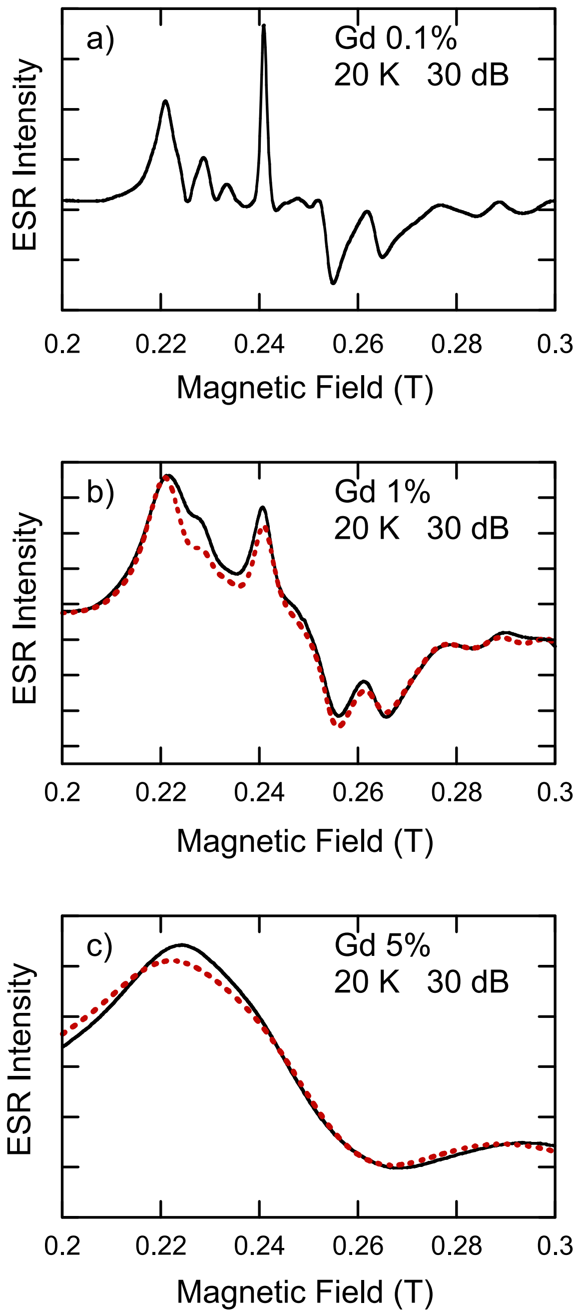

Figure 2-SI. Details of the ESR spectra of $LaPO_4$:Gd at 20 K and 30 dB for three Gd^{3+} concentrations: 1‰ (a), 1% (b) and 5% (c). The 1% and 5% spectra were fitted (broken red lines) by the convolution of the 1‰ spectrum with Lorentzian lines 2.5 mT and 16 mT linewidths, respectively.

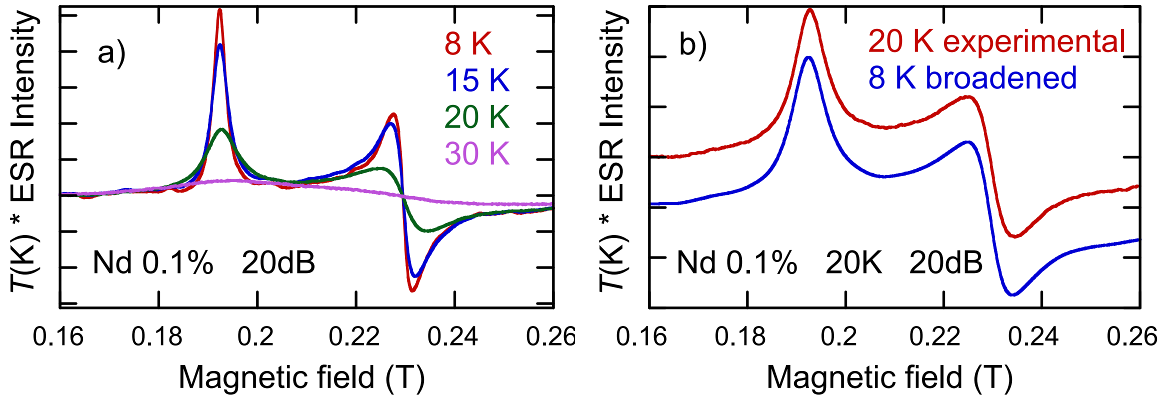

Figure 3-SI. (a) Temperature variation of the main part of the ESR spectrum of $La_{0.999}Nd_{0.001}PO_4$ at 20 dB. (b) Fit of the 20 K spectrum by the convolution of the 8 K spectrum with a lorentzian line of 3 mT linewidth.