ДОПОЛНИТЕЛЬНЫЕ МАТЕРИАЛЫ № 7

МЕТОД ДИНАМИЧЕСКОЙ МАГНИТНОЙ ВОСПРИИМЧИВОСТИ В ИССЛЕДОВАНИИ КООРДИНАЦИОННЫХ СОЕДИНЕНИЙ

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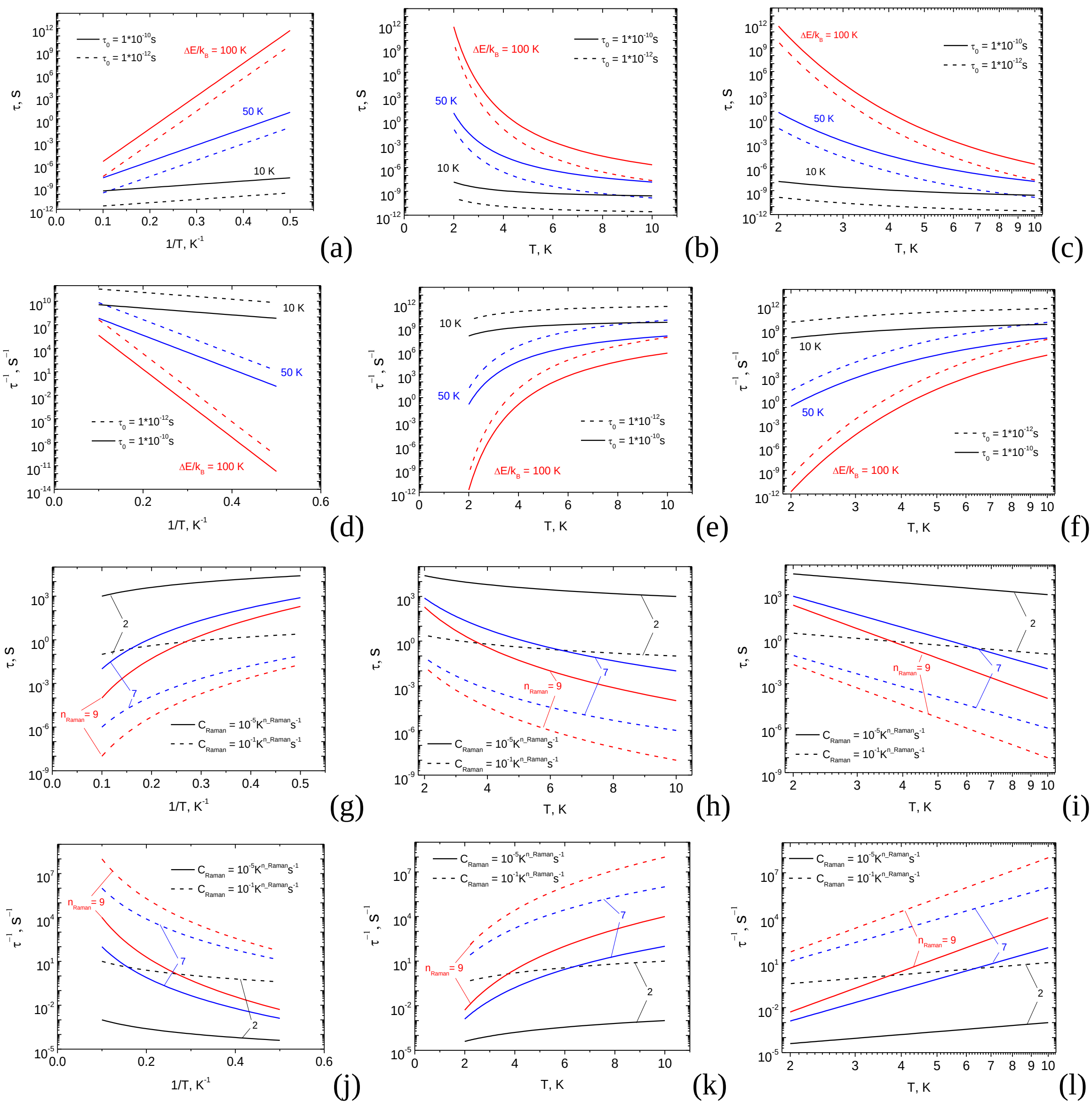


Fig. S1. Dependences of relaxation time(τ) vs. temperature (T) for different versions of coordinate axes for the Orbach (a-f) and Raman (g-l) mechanisms with the parameters presented on the graphs.

View of the generalized Debye model in the Origin program.

Part of the *.FDF file (Origin program) with the formula for approximating the dependence χ'(ν) by the generalized Debye model.

[Fitting Parameters]

Names = Hi_inf,dHi,Tau,Alpha

[Independent Variables]

v =

[Dependent Variables]

Hi1 =

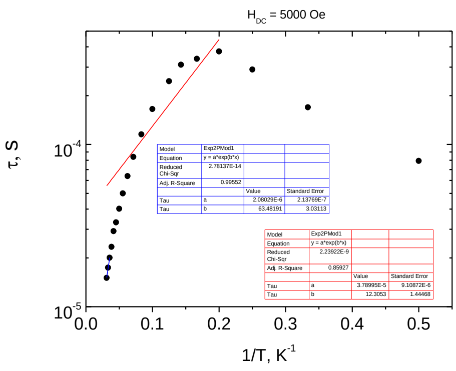
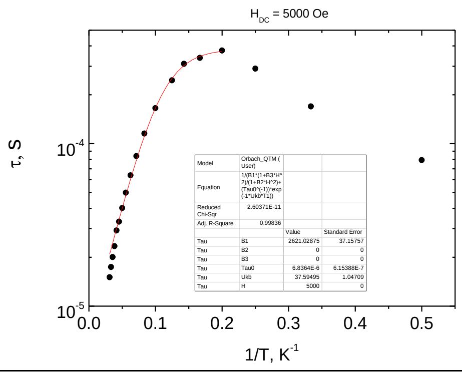
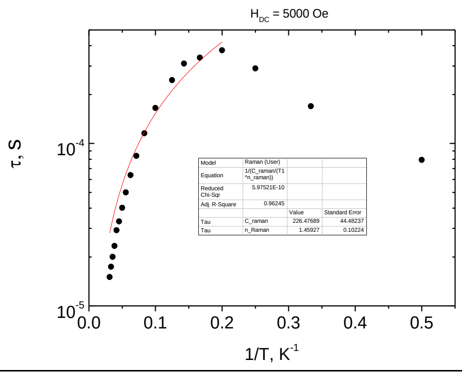
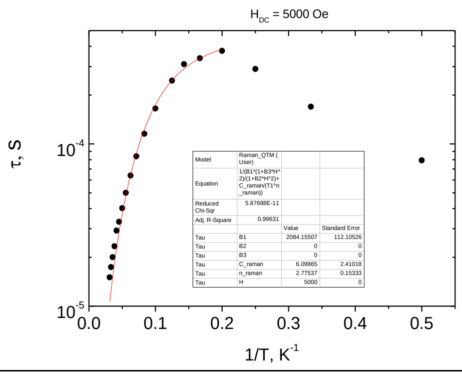
[Formula]

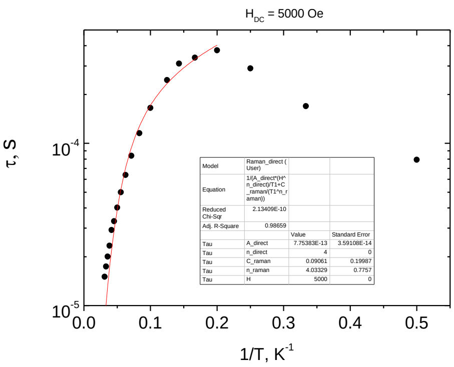
Hi_inf+((dHi)*(1+(2*Pi*v*Tau)^(1-Alpha)*sin(0.5*Alpha*3.1416)))/(1+2*(2*Pi*v*Tau)^(1-Alpha)*sin(0.5*Alpha*3.1416)+(2*Pi*v*Tau)^(2-2*Alpha))

Part of the *.FDF file (Origin program) with the formula for approximating the dependence χ"(ν) by the generalized Debye model.

```
[Fitting Parameters]
Names = dHi,Tau,Alpha



[Independent Variables]
v =



[Dependent Variables]
Hi2 =



[Formula]
((dHi)*(2*Pi*v*Tau)^(1-Alpha)*cos(0.5*Alpha*3.1416))/(1+2*(2*Pi*v*Tau)^(1-Alpha)*sin(0.5*Alpha*3.1416)+(2*Pi*v*Tau)^(2-2*Alpha))
```

Table S1. An example of enumerating relaxation mechanisms when interpreting measurement data for a complex **1** - $[NaGd(VO)_2(cbdc)_4(H_2O)_{10}]_n$, where cbdc - cyclobutane-1,1-dicarboxylic acid anion. [*Bazhina E.S., Korlyukov A.A., Voronina J.K. et al.* // Magnetochemistry. 2021. V. 7]

Dependence of the relaxation time τ on the reciprocal temperature for complex **1** (H = 5 kOe, T = 6–32 K).	Fit function, temperature range, and the best-fit parameters with uncertainties.
	**Orbach** $\tau = \tau_0 \cdot \exp(\Delta E/kT)$ T = 28–32 K $\Delta E/k$ = 63±3 K $\tau_0 = 2.1 \cdot 10^{-6} \pm 2 \cdot 10^{-7}$ s R^2 = 0.99552 (blue line) T = 6-32 K $\Delta E/k$ = 12±1 K $\tau_0 = 3.8 \cdot 10^{-5} \pm 9 \cdot 10^{-6}$ s R^2 = 0.85927 (red line) *Unsatisfactory fit*
	**Orbach+ QTM** $\tau^{-1} = \tau_0^{-1} \cdot \exp(-\Delta E/kT)$+ B T = 6-32 K $\Delta E/k$ = 38±1 K $\tau_0 = 6.8 \cdot 10^{-6} \pm 6 \cdot 10^{-7}$ s B= 2621± 37 s^{-1} R^2 = 0.99836
	**Raman** $\tau^{-1} = C_{Raman} T^{n\_Raman}$ T = 6-32 K C_{Raman}= 226±44 $s^{-1}K^{-nRaman}$ n_{Raman}= 1.5±0.1 R^2 = 0.96245
	**Raman+ QTM** $\tau^{-1} = C_{Raman} T^{nRaman}$ + B T = 6-32 K C_{Raman}= 6±2 $s^{-1}K^{-nRaman}$ n_{Raman}= 2.8±0.2 B = 2084±112 s^{-1} R^2 = 0.99631



Raman+Direct

$\tau^{-1} = C_{Raman}T^{nRaman} + A_{direct}TH^4$

T = 6-32 K

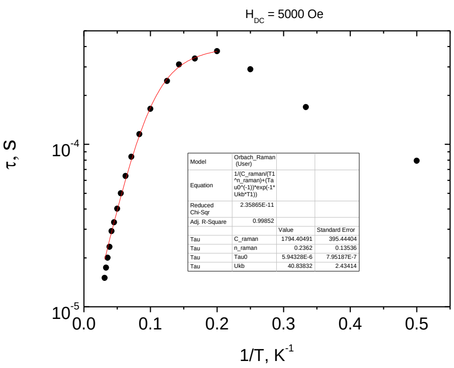
C_{Raman} = 0.09±0.2 $s^{-1}K^{-nRaman}$

n_{Raman} = 4.0±0.8

A_{direct} = $7.8\cdot10^{-13}\pm4\cdot10^{-14}$ $K^{-1}Oe^{-4}s^{-1}$

R^2 = 0.98659

Unsatisfactory fit



Orbach+Raman

$\tau^{-1} = \tau_0^{-1}\cdot\exp(-\Delta E/kT) + C_{Raman}T^{nRaman}$

T = 6-32 K

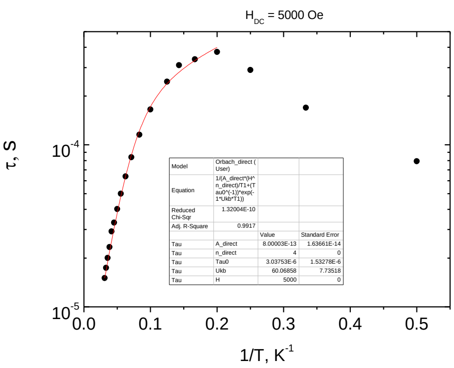
$\Delta E/k$ = 41±2 K

$\tau_0 = 5.9\cdot10^{-6}\pm8\cdot10^{-7}$ s

C_{Raman} = 1794±395 $s^{-1}K^{-nRaman}$

n_{Raman} = 0.2±0.1

R^2 = 0.99852



Orbach+Direct

$\tau^{-1} = \tau_0^{-1}\cdot\exp(-\Delta E/kT) + A_{direct}TH^4$

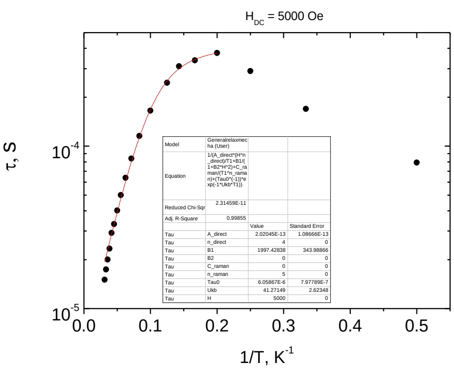
T = 6-32 K

$\Delta E/k$ = 60±8 K

$\tau_0 = 3\cdot10^{-6}\pm2\cdot10^{-6}$ s

A_{direct} = $8.0\cdot10^{-13}\pm2\cdot10^{-14}$ $K^{-1}Oe^{-4}s^{-1}$

R^2 = 0.9917



Orbach+Direct+QTM

$\tau^{-1} = \tau_0^{-1}\cdot\exp(-\Delta E/kT) + B + A_{direct}TH^4$

T = 6-32 K

$\Delta E/k$ = 41±3 K

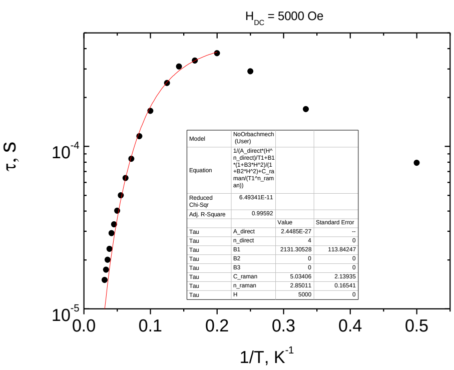
$\tau_0 = 6.1\cdot10^{-6}\pm8\cdot10^{-7}$ s

A_{direct} = $2\cdot10^{-13}\pm1\cdot10^{-13}$ $K^{-1}Oe^{-4}s^{-1}$

B = 1997±344

R^2 = 0.99855

Over-parametrization



Raman+Direct+QTM

$\tau^{-1} = C_{Raman}T^{nRaman} + B + A_{direct}TH^4$

T = 6-32 K

C_{Raman} = 5±2 $s^{-1}K^{-nRaman}$

n_{Raman} = 2.9±0.2

A_{direct} = $2\cdot10^{-27}$ $K^{-1}Oe^{-4}s^{-1}$

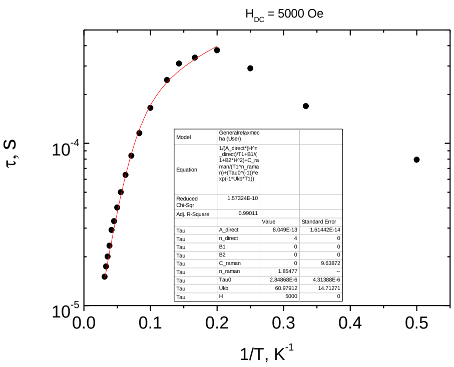
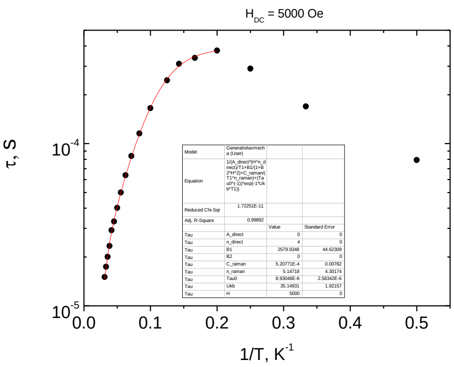
B = 2131±114

R^2 = 0.99592

Unsuccessful fit

Orbach+Raman+Direct

$\tau^{-1} = \tau_0^{-1}\cdot\exp(-\Delta E/kT) + C_{Raman}T^{nRaman} + A_{direct}TH^4$

	T = 6-32 K $\Delta E/k$ = 61±15 K $\tau_0 = 3\cdot10^{-6} \pm 4\cdot10^{-6}$ s $C_{\mathrm{Raman}} = 0\pm10\ s^{-1}K^{-nRaman}$ n_{Raman}= 1.9 $A_{direct} = 8.0\cdot10^{-13} \pm 2\cdot10^{-14}\ K^{-1}Oe^{-4}s^{-1}$ R^2 = 0.99011 *Over-parametrization* *Unsuccessful fit*
	**Orbach+Raman+QTM** $\tau^{-1} = \tau_0^{-1}\cdot\exp(-\Delta E/kT)+C_{\mathrm{Raman}}T^{\mathrm{nRaman}}+B$ T = 6-32 K $\Delta E/k$ = 35±2 K $\tau_0 = 9\cdot10^{-6} \pm 3\cdot10^{-6}$ s $C_{\mathrm{Raman}} = 5\cdot10^{-4}\pm8\cdot10^{-3}\ s^{-1}K^{-nRaman}$ n_{Raman}= 5±4 B = 2580±45 R^2 = 0.99892 *Over-parametrization*