

TRM in low magnetic fields: a minimum field that can be recorded by large multidomain grains

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1

TRM theory (SD grains)

Assuming $\alpha(T) \approx M_s(T) / M_s(0)$ and $\beta(T) \approx M_s(0) / M_s(T)$ (where α and β are the temperature dependence of the magnetic susceptibility and the saturation magnetization, respectively)

$$M(T) = \frac{M_s(T)}{J_s(T)} \approx \frac{M_s(0)}{J_s(T)} \frac{M_s(T)}{M_s(0)}$$

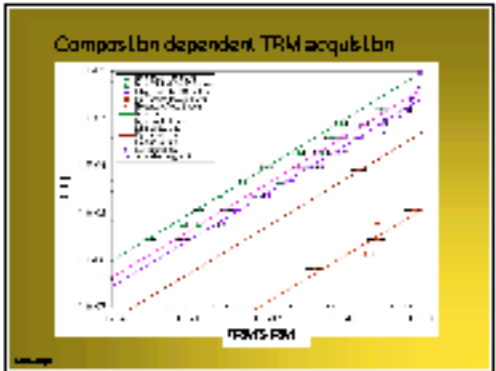
For a given T , the TRM is given by:

$$B = \frac{M_s(T)}{J_s(T)} M_s(T) \quad \text{where } M_s(T) = 0.21 \mu_0 J_s(T)$$

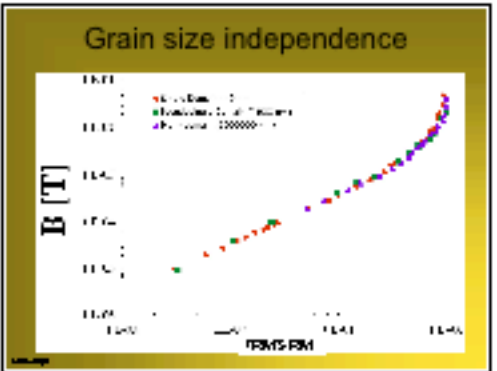
Therefore:

$$B = 0.0042 \mu_0 J_s(T) \frac{M_s(T)}{J_s(T)}$$

2



3

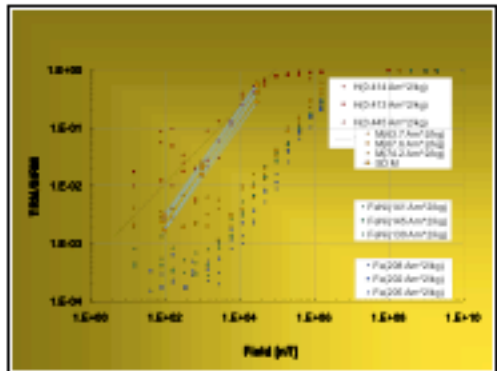


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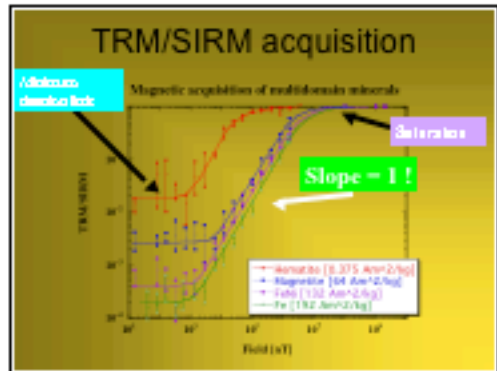
TRM acquisition of spherical nanoscale magnetite (magnetite?)

- SP magnetite becomes SD at 80K
- TRM acquired follows the Arrhenius law
- Deviation below 400K due to post-acquisition

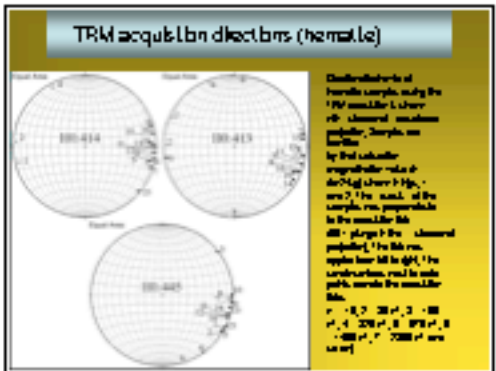
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8

Conclusions

- There is a (wide) plateau (magnetization level) starting at 1 mT below which the acquired TRM is unreliable
- This threshold may be consequence of the number of domains with the magnetic volume
- Similar threshold seems to be observed in meteorites

9