

**Erratum: Butterfly Hysteresis Loop at Nonzero Bias Field in Antiferromagnetic Molecular Rings: Cooling by Adiabatic Magnetization**  
[Phys. Rev. Lett. **89**, 246401 (2002)]

O. Waldmann, R. Koch, S. Schromm, P. Müller, I. Bernt, and R.W. Saalfrank

(Received 24 April 2003; published 5 June 2003)

DOI: 10.1103/PhysRevLett.90.229904

PACS numbers: 71.70.-d, 33.15.Kr, 75.10.Jm, 99.10.Cd

In our work [1] on the molecular ferric wheel NaFe<sub>6</sub>, we observed butterfly hysteresis of the magnetic torque at the first level-crossing field, basically due to a phonon bottleneck. We used this phenomenon as a tool to investigate the processes changing the spin state at the level crossing, providing new insight into these issues. Beyond the ones given in [1], our work is based on a host of earlier works, which were not cited. Butterflylike behavior was found in, e.g., [2]; magnetocaloric cooling was observed and discussed in many materials, e.g., antiferromagnets [3], ferrimagnets [4], superconductors [5], and small metal complexes [2,6,7]; the phonon bottleneck and mechanisms of spin relaxation were observed and discussed in many works, e.g., [8–10].

- [1] O. Waldmann *et al.*, Phys. Rev. Lett. **89**, 246401 (2002).
- [2] K. Amaya *et al.*, Phys. Lett. **28A**, 732 (1969); F. Varret *et al.*, Solid State Commun. **14**, 17 (1974); Y. Shapira *et al.*, *ibid.* **70**, 355 (1989); Y. Shapira *et al.*, Phys. Rev. B **59**, 1046 (1999); R. Schenker *et al.*, Chem. Phys. Lett. **358**, 413 (2002).
- [3] R. J. Joenk, Phys. Rev. **128**, 1634 (1962).
- [4] A. E. Clark and E. Callen, Phys. Rev. Lett. **23**, 307 (1969).
- [5] K. Mendelsohn and J. R. Moore, Nature (London) **133**, 413 (1934); R. R. Hake and L. J. Barnes, in *Proceedings of the 9th International Conference on Low Temperature Physics, Columbus, 1964*, edited by J. G. Daunt, D. O. Edwards, F. J. Milford, and M. Yaqub (Plenum, New York, 1965), p. 513.
- [6] C. Kittel, Physica (Amsterdam) **24A**, S88 (1958); W. P. Wolf, Phys. Rev. **115**, 1196 (1959).
- [7] S. A. Friedberg and C. A. Raquet, J. Appl. Phys. **39**, 1132 (1968); B. E. Myers *et al.*, Phys. Rev. B **6**, 3488 (1972); D. L. Meier *et al.*, *ibid.* **28**, 2668 (1983).
- [8] J. H. Van Vleck, Phys. Rev. **59**, 724 (1941); V. Bindilatti *et al.*, Solid State Commun. **77**, 423 (1991).
- [9] Y. Shapira *et al.*, Phys. Rev. B **63**, 094422 (2001).
- [10] J. H. Van Vleck, Phys. Rev. **57**, 426 (1940); R. D. Mattuck and M. W. P. Strandberg, Phys. Rev. **119**, 1204 (1960).