RETRACTION

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Magnetic carbon

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In this Letter we reported high-temperature ferromagnetism in a polymeric phase of pure carbon that was purportedly free of ferromagnetic impurities[1]. Since then, however, measurements made on the same and similar samples using particle-induced X-ray emission (PIXE) with a proton microbeam have indicated that these had considerable iron content[2–4]. Also, polymerized C_{60} samples mixed with iron before polymerization had a similar Curie temperature (500 K) to those we described[1], owing to the presence of the compound Fe_3C (cementite)[5]. In addition, it has since been shown that the pure rhombohedral C_{60} phase is not ferromagnetic[6].

Nevertheless, magnetic order in impurity-free graphitic structures at room temperature has been demonstrated independently[7] (before and after publication of ref. 1). Ferromagnetic properties may yet be found in polymerized states of C_{60} with different structural defects and light-element (H, O, B, N) content[8].

T.L.M. and P.S. decline to sign this retraction because they do not believe that the earlier results[1], supported in subsequent studies[9,10], are totally invalidated by these findings[2–6].

1. Makarova, T. L. *et al.* Magnetic carbon. *Nature* **413,** 716–718 (2001); corrigendum **436,** 1200 (2005).
2. Höhne, R. & Esquinazi, P. Can carbon be ferromagnetic? *Adv. Mater.* **14,** 753–756 (2002).
3. Spemann, D. *et al.* Evidence for intrinsic weak ferromagnetism in a C_{60} polymer by PIXE and MFM. *Nucl. Instrum. Meth. B* **210,** 531–536 (2003).
4. Han, K. H. *et al.* Observation of intrinsic magnetic domains in C_{60} polymer. *Carbon* **41,** 785–795 (2003); addendum **431,** 2425–2426 (2003).
5. Talyzin, A., Dzwilewski, A., Drubovinsky, L., Setzer, A. & Esquinazi, P. Magnetic properties of polymerized C_{60} with Fe. Preprint at ⟨http://arXiv.org/abs/cond-mat/0602306⟩.
6. Boukhvalov, D. W. *et al.* Testing the magnetism of polymerized fullerene. *Phys. Rev. B* **69,** 115425 (2004).
7. Makarova, T. & Palacio, F. (eds) Ch. 24 *Carbon-based Magnetism* (Elsevier, Amsterdam, 2006).
8. Makarova, T. L. *et al.* Magnetism in photopolymerized fullerenes. *Carbon* **41,** 1575–1584 (2003).
9. Narozhnyi, V. N. *et al.* Ferromagnetic carbon with enhanced Curie temperature. *Physica B* **329,** 1217–1218 (2003).
10. Wood, R. A. *et al.* Ferromagnetic fullerene. *J. Phys. Condens. Matter* **14,** L385–L391 (2002).

RETRACTION

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Evidence for spin–charge separation in quasi-one-dimensional organic conductors

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In this Letter, we described the anomalous behaviour of the thermal conductivity k in quasi-one-dimensional Bechgaard salts. As we have since observed a conventional temperature dependence of k in another quasi-one-dimensional organic conductor, TTF-TCNQ, we remeasured the value of k in our Bechgaard salts and identified a heat leakage in the original experimental set-up, which becomes relevant for samples with very small values of k at low temperatures. In an improved set-up, the low-temperature maxima of k (as reported in Figs 2 and 3) are not reproduced, indicating that our estimate of the phonon contribution to the thermal conductivity of the Bechgaard salts is no longer valid. Because a reliable decomposition of k into a magnetic and a phononic contribution was the basis of our interpretation, we have to withdraw the conclusion that our data provided evidence for spin–charge separation.