Back

Chapter 6

Carbon Nanofiber – A Potential Superconductor

Harish K. Dubey

Book Editor(s):Madhuri Sharon, Maheshwar Sharon

First published: 19 February 2021
https://doi.org/10.1002/9781119769149.ch6

Summary

This chapter discusses the theory of superconductors, the techniques of superconductivity; and studies the different aspects of the reported superconducting metal and alloys including mixed oxides and chalcogenides. Superconductivity identified in some organic compounds like fullerene is also a point of discussion in this chapter. Superconductivity in organic compounds built of carbon and hydrogen, which are among the most common elements on earth compared to copper or osmium, have been of great interest not only for scientists who are looking for room-temperature superconductivity but also for daily life issues as organic compounds. The chapter establishes evidence on how the existing properties of carbon nanofiber (CNF) exhibit the possibility of CNFs being a superconductor too. It is evident that CNFs are the potential superconductor; if not in pure form then at least after due doping with some inorganic elements and optimized synthesis techniques.

References

Meissner, W. and Ochsenfeld, R., Ein neuer Effekt bei Eintritt der Supraleitfähigkeit. *Naturwiss.*, **21**, 787, 1933, doi:10.1007/BF01504252.

Web of Science® | Google Scholar

wikipedia.org/wiki/Listofsuperconductors

Google Scholar

Meijer Paul, H.E., Kamerlingh Onnes and the discovery of superconductivity. *Am. J. Phys.*, **62**, 1105, 1994, 10.1119/L17669.

Back

Bardeen, J., Cooper, L.N., Schrieffer, J.R., Microscopic theory of superconductivity. *Phys. Rev.*, **106**, 1, 162–164, 1957.

CAS | Web of Science® | Google Scholar

AZoM, *Superconductors - Critical temperatures of some pure metals or type 1 superconductors*, AZO Materials, AZoNetwork UK Ltd., Manchester, UK, Aug 14, 2003.

Google Scholar

Bednorz, J.G. and Muller, K.A., Nobel lecture, Perovskite-type oxides The new approach to high-T, superconductivity, *Reviews of Modern Physics*, **60**, 3, 585–600, 1988.

CAS | Web of Science® | Google Scholar

Jérome, D., Mazaud, A., Ribault, M., Superconductivity in a synthetic organic conductor (TMTSF)2PF 6. *J. Phys. Lett.* (France), **41**, 95–98, 1980.

Google Scholar

Zhao, G.-M., Wang, J., Ren, Y., Beeli, P., Science Gov, Gateway of U. S. Federal Science, 2012-02-01.

Google Scholar

Wong, C.H., Buntov, E.A., Guseva, M.B., Kasimova, R.E., Rychkov, V.N., Zatsepin, A.F., Superconductivity in ultra-thin carbon nanotubes and carbyne-nanotube composites: An ab-initio approach. *Carbon*, **125**, 509–515, 2017, DOI: 10.1016/j.carbon.2017.09.077.

CAS | Web of Science® | Google Scholar

Endo, M., Takeuchi, K., Kobori, K., Takahashi, K., Kroto, H.W., Sarkar, A., Pyrolytic carbon nanotubes from vapor-grown carbon fibes. *Carbon*, **33**, 7, 873–881, 1995.

CAS | Web of Science® | Google Scholar

Buzea, C. and Pacheco, I., Electrical properties of nanowires and nanofibers, in: *Handbook of Nanofibers*, pp. 1–62, Springer, Springer Publishing House, New York City, USA, 2018.

Google Scholar

Back