Compression of a Fullerene-Graphene Composite Material

3/2015

Scientific Achievement

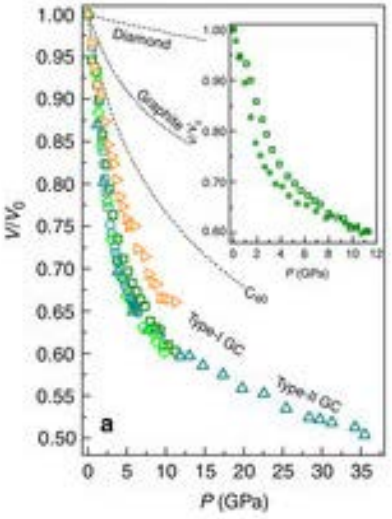
Hydrostatic and triaxial compression of Type IIG glassy carbon shows outstanding mechanical properties, including high strength, high volume compression *and* superelastic recovery.

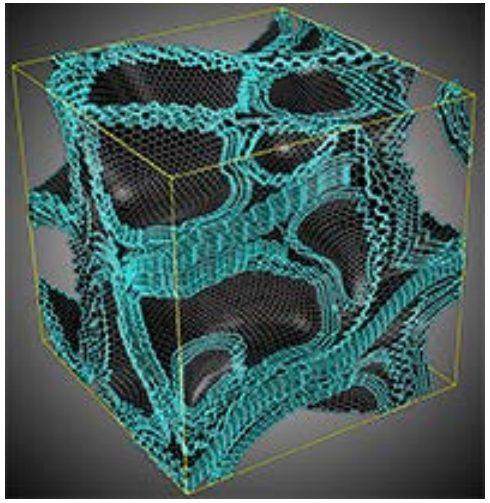
Significance and Impact

Control of concentration, size and shape of fullerene-like spheroids in a graphene matrix is expected to result in the ability to tailor topological connectivity to graphene layers and thereby yield composite materials with tunable mechanical properties.

Research Details

- New *in-situ* techniques for direct volume determination, acoustic wave velocity measurements, and x-ray diffraction in the Paris-Edinburgh cell.
- Molecular dynamics simulations reveals the topological nature of the material and gives insight into its unusual properties.





Facilities: Carnegie Institution, HPCAT Beamline 16-BM-B

Zhao, Z., et al. Nanoarchitectured materials composed of fullerene-like spheroids and disordered graphene layers with tunable mechanical properties. Nat Mater, 10.1038/ncomms7212 (2015).