

# Benzene-Derived Carbon Nanothreads

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## Scientific Achievement

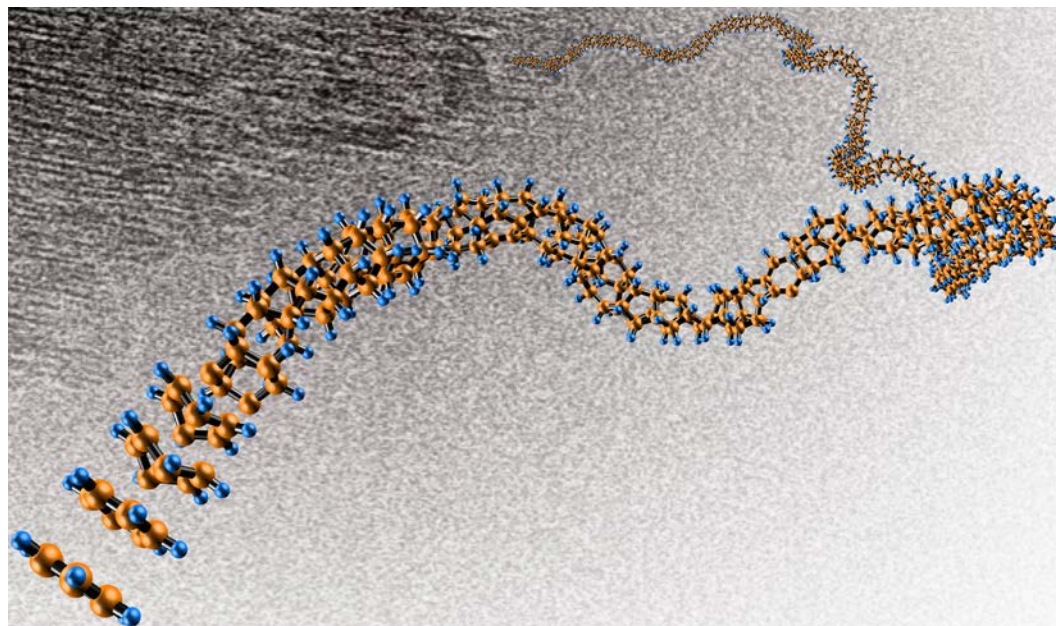
Synthesis of a new carbon nanomaterial from benzene under pressure that is the thinnest possible thread of the diamond structure

## Significance and Impact

These  $sp^3$  nanothreads should have diverse applications owing to their unique properties, including strength, compared to conventional  $sp^2$  carbon nanotubes

## Research Details

- Slow compression/decompression of benzene allows recovery to ambient pressure of carbon nanothreads capped by hydrogen.
- Threads were characterized by synchrotron x-ray diffraction, neutron diffraction, TEM, Raman spectroscopy, NMR, and first principles calculations made possible by the Efree ERFC.



Facilities: SNS, Oak Ridge; APS, Argonne

Fitzgibbons, T.C., Guthrie, M., Xu, E.-S., Crespi, V.H., Davidowski, S.K., Cody, G.D., Alem, N., & Badding, J.V., Benzene-derived carbon nanothreads. *Nat Mater*, 10.1038/nmat4088 (2014).



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