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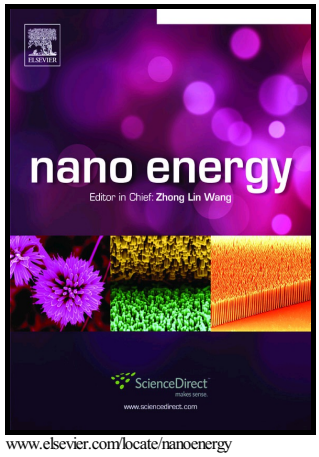


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# Architecture and Properties of a Novel Two-Dimensional Carbon Material-Graphtetrayne

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**Abstract:**

A novel 2D carbon allotrope-Graphtetrayne (GTY), features four acetylene linkages between the pairs of benzene rings to form 30-C hexagons was synthesized by a facile synthesized route of Sonagashira cross-coupling reaction of hexaethynylbenzene and diiodobutadiyne. This all-carbon material shows a distinct structural feature, rich triple bonds and super large cavities structures, which not only has high chemical activity, but also show the high stability. GTY displays excellent semiconductor property of conductivity of $3 \times 10^{-4}$ S/m at room temperature. GTY films were controlled grown on surface of copper with large areas and controlled thickness, as an efficient Li storage material for the fabrication of high-performance Li-ion batteries. The measured maximum Li storage capacity of GTY reached as high as 947 mA·h/g, this is due to high chemical activity and super large porous for high efficient ion transport.

**Graphic abstract**