

Review: Carbide-Derived Carbons

from Porous Networks to Nanotubes and Graphene

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Achievement

Our feature review article provides a comprehensive overview on synthesis, structure, properties and applications of Carbide-Derived Carbons (CDCs). We focus on current and emerging applications of CDC in the fields of electric energy and gas storage. In particular, this is the first comprehensive review of CDC that includes synthesis and application of epitaxial graphene and CDC thin films for pattern micro-supercapacitors. We provide a critical review on past research and outline fields with open questions and potential applications future works will need to focus on.

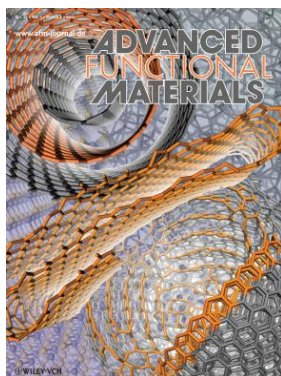


Fig. 1: Cover of *Advanced Functional Materials* depicting various forms of CDC: nanotubes, graphene and carbon onions.

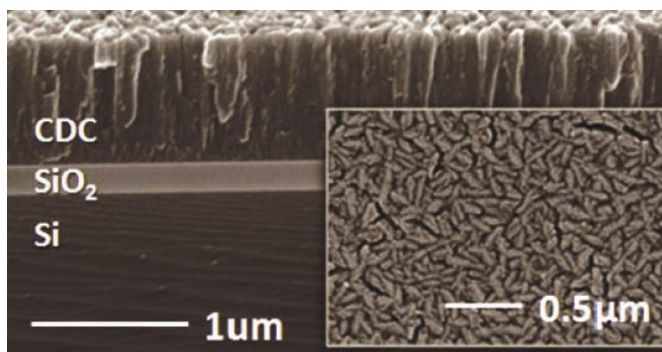


Fig. 2: CDC deposited on-chip on top of Si/SiO₂ obtained via chlorination of sputtered TiC thin films. This technique offers the possibility to pattern interdigitating separator-free supercapacitors.

Significance

CDCs have attracted significant attention over the last decade as a designer carbon nanomaterial. With many different applications ranging from desalination to gas and energy storage, it is imperative for current and future application of CDC to establish a better understanding of the structure-property relationship to benefit from the large tunability of this large family of different carbon materials.

Credit

Reference: V. Presser, M. Heon and Y. Gogotsi, *Advanced Functional Materials*, 2011, 21, 810 - 833. This work was featured as a cover story. The effort at Drexel University is based upon work supported as part of the Fluid Interface Reactions, Structures and Transport (FIRST) Center, an Energy Frontier Research Center funded by the U.S. Department of Energy, Office of Science, Office of Basic Energy Sciences under award no. ERKCC61.