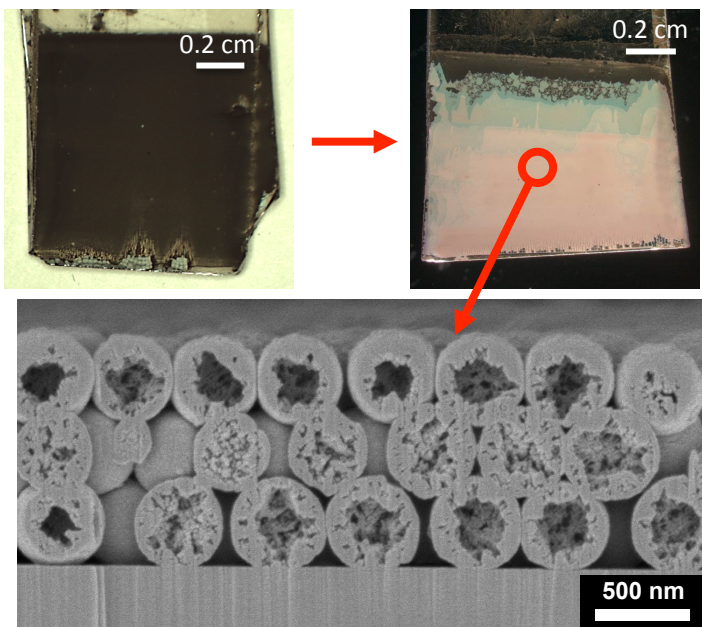


Enabling New Classes of Templated Materials Through Mesoporous Carbon Colloidal Crystals



Scientific Achievement

Ultra-high surface area carbon colloids can now be assembled into periodic arrays and used as unique templates to form mesoporous materials

Significance and Impact

The superb properties of carbon (high temperature stability, ease of removal) allow the templating of inherently challenging materials, opening the materials design space for energy-related fields

Research Details

- Modifying carbon colloids with increased surface charge promotes self-assembly of high-quality 3D colloidal crystals (arrays)
- Deposition techniques allow for oxide and semiconducting materials (e.g., HfO_2 , Al_2O_3 , Si, TiO_2 , FeO_x) to penetrate deep into the carbon mesopores
- Carbon is easily removed via thermal oxidation or oxygen plasma, preserving the deposited material's nanostructure

Matthew Goodman, Kevin Arpin, Agustin Mihi, Narihito Tatsuda, Kazuhisa Yano, Paul Braun, *Adv. Optical Mat.* (2013) *in press*.

Work was performed at University of Illinois



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