From “Nanoions” to Functional Nanomaterials

Bartosz Grzybowski

Department of Chemical and Biological Engineering and Department of Chemistry
Northwestern University, USA

Nanoscopic objects stabilized with charged organics exhibit properties fundamentally different from either molecular or macromoleculer ions, and can combine ionic-like properties with electronic and ionic conductivity and/or photoexcitability. By careful control of electrostatic interactions, ”nanoions” of various shapes and material compositions can be assembled into functional nanomaterials including 3D supracrystals, ”layered” crystals, or extended films. Depending on the properties of the charged organics, these nanomaterials can act as nanopositioners, chemical amplifiers, photoconductors and inverse photoconductors, or batteries. In my lecture I will discuss both the fundamental aspects of nanoscale electrostatics and electrodynamics , as well as the practical applications of ”nanoions” in chemical sensing and amplification, electronics, and energy storage.

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