

Hybrid materials

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The word *hybrid* (from the Latin *hybrida*, meaning “mongrel”) in materials chemistry refers to solids of a mixed (organic and inorganic) nature. Perhaps no other route to such materials has been more successful, from a functional viewpoint, than the sol-gel process to make “doped” glass (silica) invented by David Avnir in 1984.

Organic molecules, biomolecules, polymers, metal nanoparticles, nanostructured elements and nanostructured compounds are, literally, entrapped within the inner (nano)cavities of artificial glasses, affording functional materials for all sorts of applications.

The outcomes of this *hybridization* process in chemical, physical and biochemical research are reported in thousands of research papers, and can be found in many different functional products that benefit society at large.

This is the “integrative” approach to the design of multifunctional materials that is neatly described in Clement Sanchez’s contribution (DOI: 10.1039/c4nr01788a) to this *Nanoscale* themed issue on “Hybrid materials”, dedicated to David Avnir on the occasion of his 65th birthday.

Contributions from leading groups around the globe, including those of Reetz with entrapped-lipases (DOI: 10.1039/c3nr06317h), Kessler with the elegant sol-gel nanochemistry (DOI: 10.1039/c3nr06336d), Pagliaro with entrapped metal nanoparticles (DOI: 10.1039/c3nr06127b), and Huang with entrapped metal nanospheres (DOI: 10.1039/c4nr00520a), complement new excellent work with the emerging nanomaterial — graphene — that is, functionalized with nanoparticles (Zhao, DOI: 10.1039/c4nr00612g), polymers (Samori, DOI: 10.1039/c4nr00256c), carbon nanotubes (Rogers, DOI: 10.1039/c4nr01028k), ions (Zhang, DOI: 10.1039/c3nr06730k) and inorganic nanosheets (Xu, DOI: 10.1039/c4nr00116h) to afford hybrid nanocomposites of exceptional performance in catalytic, biological, chemical and electronic applications.

We are convinced that progress in the field of hybrid materials will enable mankind to solve the sustainability crisis by providing clean energy, affordable energy storage, the clean manufacture of chemicals and environmental remediation. Hopefully, the articles collected in this special issue will provide inspiration for further progress in these and related fields.

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