

# Nanomaterials and the Environment: Global impact of tiny materials

Raymond L.D. Whitby\*  
Rosa Busquets

Nanoscience & Nanotechnology Group,  
School of Pharmacy & Biomolecular Sciences, University of Brighton,  
Lewes Road, Brighton, BN2 4GJ, United Kingdom

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It is an honor to introduce this inaugural volume of the new open access journal *Nanomaterials and the Environment (NATE)*. The association of nanomaterials with the environment is a rapidly emerging and often controversial area, and it is important to have a journal that brings together key developments in this expanding scientific and engineering field, which disseminates new ideas and technical advances to audiences across the globe.

Nanomaterials offer superior performance to their larger counterparts by scaling down the size of materials to a point where the surface atoms dominate the properties of the material or through a substantial increase in surface area. Whilst the early 1990s saw the explosion of nanomaterial research and development, natural nanomaterials have been present in society and nature for far longer. Though the exposure and impact of such nanomaterials on plant life and organisms is still under investigation, it is the contemporary, targeted large scale production and use of nanomaterials that represents a significant concern through nanomaterial release, migration, transformation and interaction with plants and organisms throughout the environment [1]. Through the implementation of responsible use of nanomaterials and extensive investigations of nanomaterial interaction with the environment, such risks can be mitigated or avoided, thus leaving the research community, industry and end-users to benefit from the use of nanotechnology.

Increasing interest has developed in the use of nanomaterials in a wide variety of environmental applications, including, but not limited to, wastewater, groundwater, soil and air purification [2–6], drug delivery in the environment [7,8], capture and storage or recycling of greenhouse gases, critical metals and chemicals [9–13], the development of barriers, filters and sensors [14–18]. This has led to a phenomenal number of

publications, patents and nanotechnology-based devices with an environmental consideration and is occurring alongside the emergence of standardized testing criteria, which is helping to inform legislation.

The launching of *NATE* provides an exciting opportunity for a host journal that focuses specifically on environmental applications, implications, and other issues that link nanomaterials and the environment. This is a unique journal, with tremendous expected impact in the scientific literature and easy accessibility for scientists, stakeholders, and the public interested in the area of nanotechnology and nanomaterials. Exciting advances in open access publishing have rapidly unfolded as well, and we will take advantage of the best of these practices: rapid and transparent peer review; free access to readers around the world; indexing and database inclusion; low publication costs; and innovative dissemination through social media. The journal's advisory board has gathered a number of key academics in the field of nanoscience and the effect of nanomaterials in the environment, including Professor Sir Harold Kroto, 1996 Nobel Laureate in Chemistry for discovery of buckminsterfullerenes (nanoscale all-carbon spheres).

Our first original research article in *NATE* comes from Prof. Sakthi Kumar of Toyo University in Japan. Kumar and co-authors demonstrate that the biological sources, seed shell and meal, which are the byproducts of *Jatropha* biodiesel industry, can be efficiently utilized for the synthesis of near uniform gold nanoparticles, thus providing a green, renewable source of a reduction chemical in the synthesis of high purity, high quality nanomaterials.

We hope readers will enjoy this first volume of *NATE* and look forward to receiving manuscript submissions from new authors.

\* E-mail: r.whitby@brighton.ac.uk

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