

# ADVANCED MATERIALS SCIENCE AND GRAPHENE NANOTECHNOLOGY

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## Opportunities & Challenges for Use of Nanotechnology in Nutrition, Green and Composites -Based Materials

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Nanotechnology has immense potential and abilities to control the materials world including cement-based materials. It is the science of extremely tiny particle that deals with the study and use of materials and devices that operate at unimaginable nanometre scale i.e., one billionth, or  $10^{-9}$ , of a meter, the “green economy” concept has offered the opportunity to change the way that society manages the interaction of the environmental and economic domains. To enable society to build and sustain a green economy, the associated concept of “green nanotechnology” aims to exploit nano-innovations in materials science and engineering to generate products and processes that are energy efficient as well as economically and environmentally sustainable. The potential for application of nanotechnology in cement-based materials is huge. Currently, applications of nanotechnology in cement-based materials in several areas including construction of concrete roads are being explored. Nanotechnology has immense potential to result in a new generation of concrete, stronger and more durable, with desired stress-strain behaviour and possibly with the whole range of newly introduced properties. Enhanced flexural behaviour of the concrete may lead a reduction in the concrete slab thickness used in the construction of concrete pavements. The use of nanotechnology in the development of innovative packaging materials has had a remarkable growth in the last years and is expected to have an important impact on the food market in the near future. This growth is a consequence of the increasing knowledge about nanotechnology applications in food packaging, which brought to the academia and industry new tools for the development of new nanotechnology-based products with improved technological functionalities and properties, as well as the corresponding advances in materials science, processing technology, and analytical techniques. of the nanomaterials used in food packaging and new innovative solutions that have been presented by researchers in academia and industry.

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