118

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The Augmentation of nanotechnology era: A concise review on fundamental concepts of nanotechnology and applications in material science and technology

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Highlights

- The fundamental concept and inherent properties of minute scale nanomaterials are reported.
- Milestone and breakthrough awards for nanomaterials are reported from last four decades.
- Recent and modern fabrication methods of nanomaterials are elaborated.
- Most recent and foremost applications of nanomaterials are portrayed in present review.
- The flexible nanocomposite, wearable sensors and self-healing structures are focussed.

Abstract

The present era in terms of research is recognised as an era of nanoscience and nanotechnology. Since almost all the branches of science, engineering and technology are coalesce together to give effective solutions in all manner to serve the mankind better. The term nanomaterial becoming popular day after day and gaining the attention of academician, research scholars, and scientists due to its unique properties as compared to the bulk material. The main motive to write the review is to elaborates the fundamental concepts of nanotechnology, origin of nanotechnology, characteristics properties of nanomaterials such as shape and size, surface charge, stability, quantum size effect, optical properties, mechanical, magnetic, thermal, electrical properties, chemical structure, composition, catalytic activity and the fabrication methods (Top-down and bottom-up methods). The review further extends to convolutes the systematic classification of nanomaterials based on configuration and dimensionality such as 0D, 1D, 2D, and 3D. In addition to this, the review also focused on the surface morphology, chemical nature and various compositional based nanostructures such as organic nanoparticles (NP's), inorganic NP's, carbon based NP's, hybrid and composite based

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