Nanomaterials Are Showing Promise In Nanotechnology Applications

September 11 2004

Researchers are continuing to make giant strides toward realizing the exceptional potential of nanotechnology. Their efforts have resulted in the advent of stronger, lighter, and improved nanomaterials currently finding extensive use in several high-performance applications. “Nanotechnology is well poised to become an accepted technology in years to come and many future applications are likely to have some form of nanotechnology embedded in them,” says Technical Insights Analyst Hrishikesh Bidwe.

However, in the initial stages, application development is likely to be hampered by the lack of economy of scale. Manufacturing costs of products using nanomaterials, for example, will probably escalate beyond that of products made using conventional materials, making it prohibitively expensive for some applications.

“This is the reason nanomaterials are currently being used only in critical applications such as aerospace and defense, where superior performance takes precedence over costs,” comments Bidwe.

Another deterrent for development of nanotechnology-based applications is the lack of knowledge about certain properties of nanomaterials, especially in healthcare applications, with regard to their reactions to the human body.

Many of the healthcare products based on nanopowders such as sunscreens are commercially available in countries such as Australia.

Though theoretical explanations are available on the possible reactions of nano-coated or nano-enhanced drugs within the human body, the real effect is yet to be ascertained, and until results are available, their reliability is anticipated to remain low.

The non-availability of comprehensive studies on the interaction of nanomaterials with the environment is yet another challenge slowing the development of nanotechnology applications.

“With nanomaterials opening up a variety of possible applications, the lack of awareness about their impact on the environment and the possible treatment methods to deal with this is likely to hinder market acceptance,” comments Bidwe.

Despite such limitations, nanomaterials have immense potential to initiate innovation in almost all fields of science. Some exhilarating possibilities include novel imaging agents that can identify cancer cells, and targeted delivery systems that can treat them prior to their spreading without harming the healthy tissues.

The mere possibility of a customizable drug for treatment of fatal diseases such as cancer is spurring a flurry of activity among researchers. These efforts are gaining further momentum through extensive support from governments and large-scale funding from venture capitalists.

“In cases where current technologies are proving insufficient, the need for new techniques that can improve upon existing materials and create opportunities for fresh applications has become quite imminent,” says Bidwe.

Nanotechnology, with its ability to redefine the manufacturing processes and ensure value enhancement, has the potential to fill this void and cater to wide-ranging requirements across different verticals.

“With many industries seeking next-generation technologies to help them produce cost-effective products with high market sustenance, nanotechnology is likely to continue its spectacular progression,” concludes Bidwe.