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Innovative Development in the Fields of Nanotechnology

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Commentary

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ABOUT THE STUDY

In the rapidly developing field of nanotechnology, different materials nanoscale particles are engineered. Nanotechnology is described as "the invention and utilisation of structures, technologies, and systems that have novel qualities and functionalities because of their small scale" by the U.S. Environmental Protection Agency (EPA). Nanotechnology is "the understanding and control of matter at dimensions between 1 and 100 nm, where unique phenomena enable revolutionary applications," according to the National Nanotechnology Initiative (NNI, 2010).

Federal funding for nanotechnology research in the United States increased from $464 million in 2001 to almost $1.8 billion for the 2011 year. The total investments made by private research industries in the same field, excluding federal financing, are at least equal to those made by the government. By 2015, it is predicted that the market for manufactured goods related to nanotechnology would be worth more than $2.5 trillion, according to Lux Research, an independent research and consultancy business that provides strategic guidance on new technologies. Furthermore, it is anticipated that by 2014, nanomaterials will be used in around 16% of produced healthcare and life sciences products as well as roughly 50% of electronics and IT applications.

In the future, nanotechnology may have a significant impact on food items and the food industry. In addition to the food industry, nanotechnology is employed in the management of infectious diseases, the maintenance of sterile surfaces in medical equipment and devices, and the prevention of biological contamination in consumer products. The use and application of nanotechnology in food and crop biotechnology, as well as its interactions with microbes and potential health effects on consumers, are the main topics of this article.

It is well known that thin layers of nanoscale particles can be used as coating materials to enhance specific surface qualities as well as photocatalysts for breaking down organic environmental pollutants. For the particle-assemblies to perform better, the particle arrangement has grown in significance. Several techniques, including the casting of a

colloidal solution and the self-assembly of particles using a more complex alternative layer-by-layer assembly methodology, have been proposed to construct a two-dimensional packing of nanoparticles. Researchers presented a series of research proving the immobilisation of gold, silver, and CdS nano-particles using a Langmuir monolayer of fatty amine, which is based on the electrostatic immobilisation of particles at an air-water interface.

The studies demonstrated that by altering the pH of the colloidal sub phase, the amount of particle inclusion may be adjusted electrostatically. The LB technique can also be widely applied to the construction of other heterogeneous or alternative nano-assemblies since it has the benefit of manufacturing multilayers of nanoparticles with a highly ordered layer structure. The self-assembly method, which uses a positively charged LB monolayer of long-chain alkylammonium salt, and the LB technique, which involves depositing a cationic Langmuir monolayer on a colloidal sub phase, have both been used in our recent work.

An LB monolayer that arranges the SiO_2 or TiO_2 nanoparticles on the solid substrate in a two-dimensional pattern. We primarily looked at the impact of particle size and the pH of the colloidal sub phase in the immobilising processes of both SiO_2 and TiO_2 particles in order to identify the ideal circumstances that give homogeneous and closely packed layers.

There has been a lot of research done on nano composites' possible industrial uses. However, the ability to manage the anisotropy of these materials is the most notable behaviour of Nano composites based on thermoplastic polymers packed with GO and CNTs. The fillers are indeed subjected to nonlinear flow during processing, which makes it difficult to manage anisotropy and, as a result, qualities like mechanical or electrical, for example. In other words, rather than exercising control, we are subject to the processing conditions. Regarding suspensions, the situation is very different since, at least in the dilute and semi-dilute regime, Brownian forces predominate.