NANOMATERIALS FOR DIFFERENT APPLICATIONS AT SIGMA - ALDRICH

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Abstract

Understanding the relationship between properties and performance of nanomaterials has always been a major challenge for Materials Science. Due to the particle size-dependent effects, nanomaterial's properties can substantially deviate from those of the same substance on a micron- or larger scale, which explains strong interest to nanomaterials as novel building blocks for modern technologies.

Because of its remarkable electronic, mechanical, and optical properties, graphene has generated a significant research interest and attracted a lot of investments in such areas as advanced electronic sensors, displays, transistors, batteries, supercapacitors, fuel cells, as well as photovoltaic (solar) systems for energy generation.

In order to unravel graphene's performance details and to determine its behavior in real applications, researchers require high-quality materials with reproducible performance characteristics on the scale, which exceeds capabilities of a conventional research laboratory. In general, an efficient transfer of novel technologies from a small research scale to a much large prototype scale and beyond proceeds through intermediate steps, which include an initial scale up, validation, reproducibility studies and final scale up to the manufacturing scale available at Sigma-Aldrich.

The presentation highlights Sigma–Aldrich's R&D and scale-up capabilities in the area of graphene and other inorganic nanomaterials. It will discuss the current product portfolio focusing on materials for electronic, magnetic and optical applications.

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