Controlled preparation of heterogeneous nanostructures by Chemical Vapor Deposition

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The synthesis of heterogeneous nanostructures (HNs) such as core/shell nanoparticles and particle decorated nanotubes is of interest in a variety of fields, e.g. sensors, microelectronics, biomedicine, energy storage, metallurgical industry, and others. These nanostructures present unprecedented properties, which arise from integrating multi-nanocomponents, each tailored to address a different demand. Over the years, various procedures and methods have been developed to produce such materials. Among them, chemical vapor deposition (CVD) stands out due to the possibility of producing HNs via a one-pot approach, saving time and resources while increasing chemical yield. Although its advantages, the preparation of ideally designed HNs by CVD is still a challenge and several CVD variants have been proposed to synthesize these nanostructures. Herein an overview of the CVD processes used to produce HNs and their respective products' applications is presented.