

CLUSTER BEAM DEPOSITION: DO WE NEED IT?

Abstract

The convergence of top-down microfabrication with bottom-up assembling of nanoparticles to make compatible different length scales, architectures, materials, manufacturing methods is the basis for the production of novel classes of devices. This requires a paradigm shift in R&D approaches towards the fabrication and characterization of hybrid systems where heterogeneous nanoscale materials and nanoparticles must coexist and integrate with traditional microfabrication technologies. Production methods of nanoparticles in the gas phase are inherently prone to meet these requirements.

Cluster beam deposition (CBD) has emerged as a tool with a degree of complexity and maturity that makes this approach very effective for functional and length scale integration. The transition from the use of CBD as a tool for basic research to a method for the fabrication of micro and nanodevices is driven by the capability of manipulating neutral clusters and achieving high intensity, stability, repeatability, high lateral resolution, parallel processing.