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**Assembly of Nanoparticles in Multiscales and Multidimensions:
Platform for Convergence Technology**

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Abstract

The realization of emerging convergence technology requires us to have control capability on multiscale phenomena including nano, micro, and macro scales. The bridging among different scales is a prerequisite for practically manufacturing various novel nanodevices exhibiting unprecedented performance, which include nano-bio sensors, nano-electric/optical/magnetic devices and nano-energy devices such as new concept solar and fuel cells. Such integration among different scales can be called as multiscale architecturing which is challenging and demanding, but worthwhile to explore since it can become an important platform for convergence technology. In this talk, various techniques are introduced. Particularly, I will focus on the aerosol method that we developed for multidimensional multiscale assembling of nanoparticles. The concept of Ion Assisted Aerosol lithography (IAAL) that we developed will be described. This is a parallel bottom-up atmospheric approach enabling multiscale 3D buildings consisting of fundamental building block of nanoparticles with nanoscale resolution at large surface. Applications exploiting these multiscale structures will also be presented.