

## Developments of Nanocomposite Systems Prepared by Aerosol Deposition Method

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Aerosol deposition (AD) method is a novel ceramic coating method using Room Temperature Impact Consolidation (RTIC) phenomena. This method has a wide range potential for the fabrication of integrated micro devices: MEMS devices, electronic components, and novel optical devices, etc. In this method, the submicron ceramics particles were accelerated in the nozzle up to velocity of several hundred m/s by a carrier gas and sprayed onto the substrate. During impaction and interaction with substrate, these ceramic particles formed thick, dense and hard ceramics layers at room temperature. We have proposed novel concept for materializing nanocomposite materials using AD method. Our concept can apply various sizes of nanoparticles, and achieves desirable distribution of nanoparticles in hostmatrix because the structure of deposited layer is similar to that of composite powder. AD method can further tailor desired concentration of nanoparticles in host matrix by just controlling an amount of the given nanoparticles mixing with host matrix particles. We have studied several nanocomposite systems, including Au / lead zirconate titanate (PZT) for plasmonic electrooptic materials, Au / BST (or PZT) for enhanced dielectric materials, Au / Garnet and Co / alumina for novel magnetic materials, etc. In this presentation, recent developments and possibilities of novel nanocomposite films prepared AD method will be discussed in detail.