

## 【심포지움-나노 02】

# How to Make Nanostructured Materials?

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It has been shown that the properties of material can dramatically change at a particle size somewhere between 1 nm and 100 nm. In this regime, neither quantum chemistry nor solid state physics hold. The former describes the properties of atoms and molecules, while the latter the properties of solids. The term "nanostructured materials (nanomaterials)" can be classified according to their dimension<sup>(1)</sup>:

- 1). 0-D; Nanoparticles
- 2). 1-D; Nanowires, Nanotubes and Nanofilaments
- 3). 2-D; Layered or lamellar structures. Thickness of the layer is in the nanometer range
- 4). 3-D; Materials with nano-size grained microstructure (Nanostructure).

In this presentation, the focus will be given to the fabrication of 3-D nanostructured materials. For this, the control of grain growth during high-temperature processing is one of the critical issues. Note that, due to excessive interface energy of the nano-sized grains, the driving force for grain growth is enormous. Therefore, nanostructured materials cannot be obtained without the inhibition of grain growth during heat-treatment. We will suggest the mechanism of grain growth inhibition. Its practical implication will also be introduced.

1. U. Schubert & N. Husing, Synthesis of Inorganic Materials, Wiley-VCH, Weinheim, (2000).