DEVELOPMENT OF NANOSTRUCTURED MATERIALS FOR STRUCTURAL APPLICATIONS BY CNMT

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ABSTRACT

Nanotechnology is expected to give rise to a new industrial revolution in the 21st century. Because of its potential impact on the industry, many developed countries have been investing lot of their resources for its development. Given the importance of nanotechnology for sustained economic growth, Korean government formulated a 'Comprehensive Program for Developing Nanotechnology' in the year 2001. The Program consists of 'Research & Development', 'Establishment of R&D Infrastructure', and 'Workforce Education' for nanotechnologies.

Among the several R&D programs for nanotechnology development, the Frontier Research Program, 'Development of Nanostructured Materials Technologies' is the biggest nanoresearch program for development of nanostructured materials technology, spending approximately 10 million dollars every year for the next 10 years. This Program aims to develop various nanostructured materials with superior properties by creating new materials or by applying nanotechnology to the already existing materials. The R&D areas covered by the Program include nanostructured materials for structural applications, environment and energy applications, and information technology applications.

In the area of nanostructured materials for structural applications of the Program, we are developing high strength nanostructured bulk materials by severe plastic deformation, sintering nano-sized powder, or formation of nanostructure in bulk metallic glasses. High strength nanostructured composite materials with polymer, metal, and ceramic matrixes are also being developed. Technologies for multilayer coating and thermal spray coating for obtaining superhard surfaces are also included in the list under development. The author will introduce the research activities on structural nanomaterials by the Center as well as several important research results.