



# The Use of Innovative Materials in Innovative Architectural Applications. Combining Forces for High Performance Structures <sup>1</sup> ☆

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## Abstract

Nanotechnology has already revolutionized many industrial fields. The advantages through implementation of nanotechnology in architecture are multidimensional as they are not limited to sustainability and energy efficiency of buildings. The era of Nanoarchitecture has emerged, providing new possibilities that affect both architectural design and architectural applications. Flexibility and dynamics of forms and aesthetics, adaptation in external and internal requirements, protection of quality in living conditions and ad hoc control of microclimate are now feasible. Structures adopt mechanisms from nature and begin to mimic living organisms. Features such as air-purifying, self-cleaning, temperature regulation, self-healing, energy producing/saving as well as fireproofing, solar protection and insulation can be effectively combined and create high-performance buildings with extended life-cycles. Nanomaterials, i.e. carbon nanotubes, nanofibers, nanoscale truss etc, give new qualities in structural forms and their carrying capacity. This study examines the above mentioned potential combinations that can lead to an innovative intelligent system of an outer “epidermis” that can function as a structural feature of both main and secondary purpose. In this paper an overview of recent developments in Nanoarchitecture is given, together with the interesting potentials of materials which give life to the conceptual frame of contemporary architecture.