Nanoarchitectonics for the Design of Functional Materials

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Abstract

Nanotechnology is considered as a key to pursue grand challenges such as curing of diseases or energy production and storage. The superior properties of nanomaterials is usually obtained by a specific arrangement of nanoscale units, also called nanoarchitectonics.

We designed new materials mainly by combining polymer chemistry with the miniemulsion and the colloid-electrospinning processes. Herein, we report fundamental insights in the fabrication of nanomaterials by these processes. We introduced complexity in the design of the nanomaterials by tailoring their shapes and chemical natures. The nanomaterials were designed with stimuli-responsive polymers, yielding properties that are switchable upon change of pH value, electrochemical potential, or temperature. These materials found successful applications in biomedicine, catalysis, and anticorrosion.