

HARNESSING THE MAGIC OF NANO-SPACES: DISCOVERING NEW MATERIALS AND PHENOMENA FOR A SUSTAINABLE FUTURE!

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ABSTRACT

Nanoscale engineering offers powerful avenues for developing materials that directly address global environmental and energy challenges. This work focuses on the sustainable synthesis and application of functional nanomaterials, primarily natural clay minerals and nanoporous silica, utilizing eco-friendly water-based pathways. Our research framework is built upon three pillars: processes by water, leveraging it as a green solvent; structural designs with water, fabricating flexible, biomimetic, water containing architectures; and solutions for water, targeting advanced purification, controlled molecular transport, and self-healing functionalities. This presentation highlights recent developments in nanospace materials, including nanoparticle support templates for green photocatalysis, dye or biological pigment immobilization for tailored photo-functions, and strategic hybridization with diverse synthetic and biopolymers.

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