

Design of Nanostructured Catalysts and Photocatalysts for Renewable Energy and Environmental Uses

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Abstract: Designs of “active sites”, “reaction fields” and “energy injection” are important for catalyst development. In the nanospace of zeolite, mesoporous silica and MOF, it is possible to control the structure of catalytic active sites in forms of fine particles, clusters, molecules, and atomic moieties, and also possible to control the reaction fields with unique properties such as hydrophobicity and electrostatic fields. Ultrafine semiconductor photocatalysts, single-site photocatalysts, plasmonic catalysts, nano-alloy catalysts, Yolk-shell catalysts, and MOF photocatalysts, can be designed for H₂ production, CO₂ fixation, H₂O₂ synthesis, and various selective reactions.

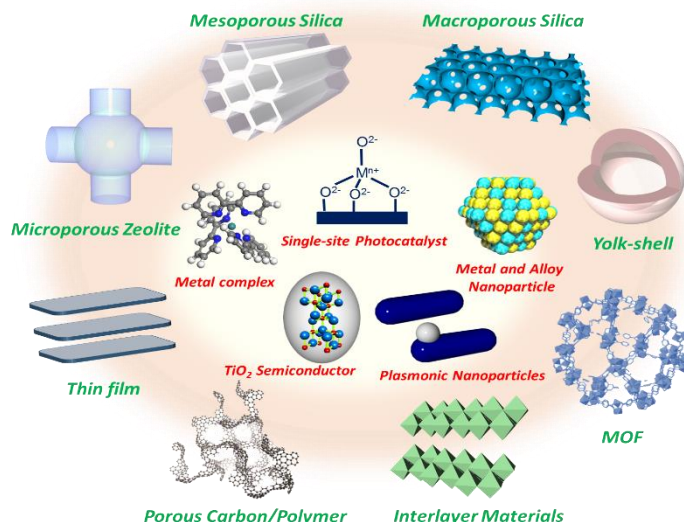


Fig. 1. Design of nanostructured catalysts and photocatalysts using nanoporous materials.

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