

PROCEEDINGS

Multiscale Catalytic Organic Synthesis Reactions of Porous Organic Polymers

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ABSTRACT

Porous organic ligand polymers (POLPs) are a new class of materials that integrate porosity and ligand functionalization. By modifying catalytically active sites (such as metal complexes, Lewis acids and bases) in the form of ligands and embedding them into organic frameworks, the precise regulation of multi-scale catalytic performance is realized. Their high specific surface area, designable pore structure and well-defined coordination environment provide a unique platform for high-efficiency heterogeneous catalysis [1,2]. In recent years, our research group has made a series of research advances in the field of POLPs catalysis and successfully developed several high-efficiency new organic synthesis systems: 1) In terms of highly selective conversion of unsaturated hydrocarbons, efficient catalysis of hydrosilylation, hydrogermanation, distannylation, carboration, and regioselective oxidative Heck reactions has been achieved, demonstrating excellent capabilities in regioselectivity and stereoselectivity control [3-5]; 2) In the field of resource utilization of inert gases, low-concentration CO₂ can be efficiently converted into various heterocyclic compounds [6]; 3) In the direction of organic electrochemical synthesis, efficient electrocatalytic oxidation and cyclization reactions have been realized under electrochemical conditions via the modification of organic guanidine polymers [7]; 4) In the field of organic photocatalysis, novel anthraquinone-based conjugated porous polymer catalysts have been designed and developed to achieve highly selective cyanation of α -amino-C(sp³)-H bonds driven by near-infrared light, breaking the wavelength limitation of traditional photocatalytic systems [8,9].

KEYWORDS

Porous organic ligand polymers; heterogeneous catalysis; electrochemical synthesis; photocatalysis

Funding Statement: This work is supported by the Natural Science Foundation of China (Nos. 22471046 and 22671071).**Conflicts of Interest:** The author declares no conflicts of interest to report regarding the present study.

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