

First Laureate, Fundamental Research

- **Research Work Title:** Design and preparation of selective catalysts based on ordered mesoporous materials and their application in chemical transformations
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Abstract:

In this research, not only the creation of several novel mesoporous materials has been achieved (more than 40 new materials with different physical, chemical, and symmetry) but the application of these important materials and introduction of new concepts for synthesis of new generation of heterogeneous catalysts have been explored, which includes

- Design and preparation of novel Periodic Mesoporous Organosilicas (PMOs) with imidazolium ionic liquid framework.
- Design and construction of varied Ordered Mesoporous Carbons (OMC) from ionic liquids doping with nitrogen and sulfur heteroatoms.
- Design and synthesis of new Ordered Mesoporous Polymers (OMP);

In addition to supervision of more than 51 Master and 19 Ph.D. students, the group has also significant impact in the development of general knowledge of mesoporous materials in Iran and provided major guidance and encouragement to Iranian chemists in studying and conducting their researches in this field. The effect of hydrophilic-hydrophobic balance in ordered mesoporous materials in order to prepare new generation of catalysts exhibiting adjustable chemoselectivities in particular chemical reactions (Smart Catalysis), the design and synthesis of novel chemical nanoreactors based on ordered mesoporous materials, the use of nitrogen-rich ordered mesoporous carbons as Carbocatalysts and also as support for immobilizing varied metal catalysts, the study of synergistic effect inside the channels of catalysts in multi-functional ordered mesoporous materials, and the application of mesoporous materials for immobilization of chiral catalysts and the confinement effect of mesochannels in improving the enantioselectivity of these catalysts, all these studies are the most important researches that have been conducted in this project during the last 15 years.

