



Industrial Consultancy & Sponsored Research (IC&SR)

An Improved Process for Synthesis of Ordered Mesoporous Materials with Ionic Liquids and the Product Thereof

IITM Technology Available for Licensing

Problem Statement

- Traditional mesoporous material synthesis method **requires large amount of surfactants**, leading to environmental concerns.
- Existing techniques **does not yield desired structural & textural properties** of mesoporous materials, **lack scalability and reproducibility**, limiting their applications.
- Efficient catalyst with high conversion & selectivity for various chemical reaction is needed.
- This invention discloses an **improved process** for the synthesis of **ordered mesoporous materials with ionic liquid and product thereof**.

Technology Category/ Market

Categories: Chemistry & Chemical Analysis | Advance Material & Manufacturing

Industry: Chemical Industry, Materials Science

Applications: Mesoporous Materials Synthesis, Catalyst Supports, Adsorbents, Drug Delivery Systems, Separation Technology, Environmental Restoration, Energy Storage, Sensing Technology

Market: The global microporous and mesoporous materials market size was **\$ 8602 Mn in 2021**, it is expected to touch **\$ 18912 Mn by 2031**, growing at **8.2% CAGR** during forecasted period.

Intellectual Property

IITM IDF No.: **1410** | IP No.: **367463 (Granted)**

TRL (Technology Readiness Level)

TRL- 3: Proof of Concept Stage.

Research Lab

Prof. Selvam P, NCCR & Dept of Chemistry

Technology

The instant invention disclosure an **improved process for synthesizing different types of mesoporous materials in various methods**, including hexagonal and cubic mesoporous silicates, Aluminosilicates, ferrisilicates, aluminophosphates, and cobalt-aluminophosphates.

FIG 1: 27Al MAS-NMR (A) & 31P MAS-NMR (B) spectra of calcined HMA-41 & CoHMA-41(50). Each synthesis method consists of specific step:

- Hexagonal Mesoporous Silicate Synthesis

- Cubic Mesoporous Silicate Synthesis

- Hexagonal Mesoporous Aluminosilicate Synthesis

- Hexagonal Mesoporous Ferrisilicate Synthesis

- Cubic Mesoporous Aluminosilicate Synthesis

- Hexagonal Mesoporous Aluminophosphates Synthesis

- Cobalt-Aluminophosphates Synthesis

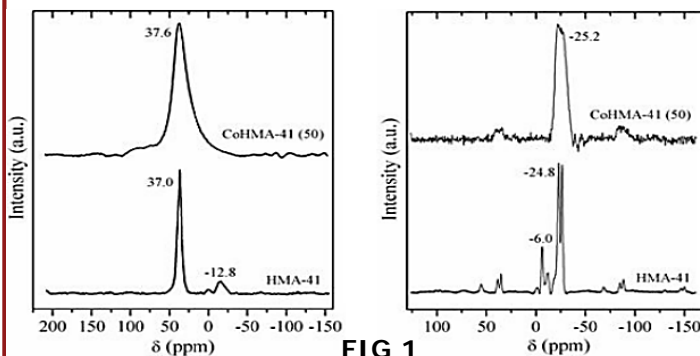


FIG 1

Key Features / Value Proposition

- User perspective:-

- User-friendly process and Environment friendly approach.**
- Customizable method** for production of high-quality mesoporous materials.

- Industrial perspective:-

- Scalable process for large-scale production.**
- Cost-effective synthesis** using affordable reagents and ionic liquid surfactants.
- Enhanced catalytic properties** with the incorporation of metal ions for **efficient chemical processes** in the industrial catalysis.

- Technology perspective:-

- Novel specific hydrothermal treatment method.**
- Control over morphology and pore structure** enables tailored material properties.
- Potential for **innovation and versatility** in various types of mesoporous material synthesis.

CONTACT US

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