Synthesis and catalytic applications of ordered and disordered mesoporous zeolites

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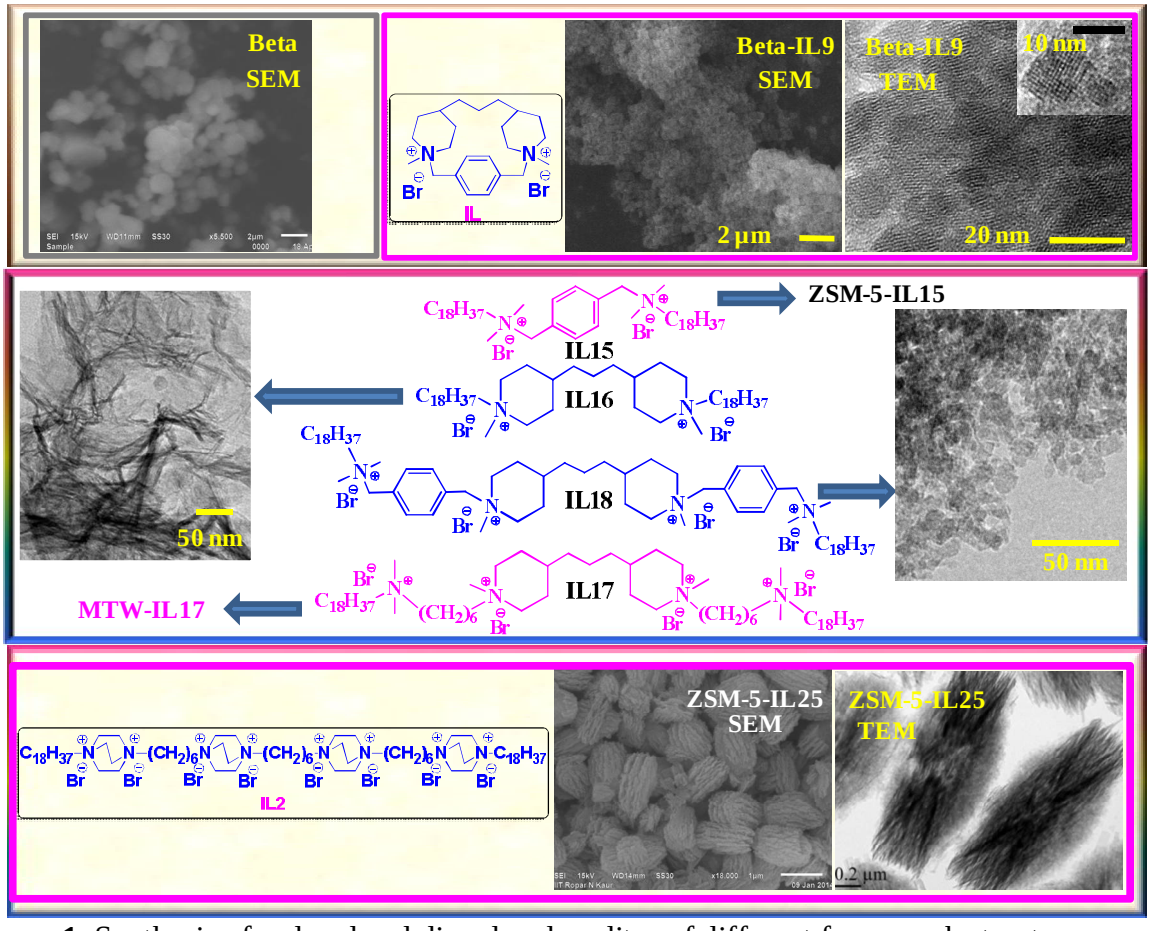
1. Introduction

Zeolites are industrially important materials that find wide applications in water softening, gas separation, and catalytic processes. Zeolites find important role in petroleum industry due to shape selectivity. However, applications of zeolites are limited in the fine-chemical synthesis due to pore diffusion constraints. Microporosity and intricate channels are boon for the petrochemical industry; however, microporous zeolite application is restricted in fine chemical synthesis involving large organic molecules. To overcome the diffusion limitation imposed by the micropores, several efforts have been made for the synthesis nanocrystalline/mesoporous zeolites in recent years [1]. It is well known in the literature that bottom-up approach is better than the top-down approach for the synthesis of mesoporous zeolites [1].



Scheme 1. Synthesis of ordered and disordered zeolites of different framework structures.

2. Materials and methods

Zeolite was synthesized by the hydrothermal methods using variety of mult-cationic structure directing agents shown in Scheme 1**.**

3. Results and discussion

Ordered and disordered zeolites of different framework structures were prepared by using a variety of new series of soft templates (Scheme 1) [2-3]. Details of synthesis, characterization and catalytic applications of these zeolites will be discussed during the presentation [2-3]. These materials were investigated in the industrially important acid catalyzed reaction to access their activity when compared to conventional zeolites and other mesoporous aluminosilicates.

4. Conclusion

Depending on the soft-templates and synthesis condition, a wide range of ordered and disordered mesoporous zeolites were prepared. Mesoporous zeolites exhibited significantly improved catalytic activity when compared to conventional zeolites and high surface area mesoporous Al-MCM-41.

References

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