Chemical Technology Division

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FROM GELS

L. Khatri[†‡], M. Z.-C. Hu, C. J. Rawn, E. A. Payzant, J.-S. Lin, L. F. Allard

Oak Ridge National Laboratory*[†]
P.O. Box 2008
Oak Ridge, TN 37831-6223
Phone: 423-241-3848
Fax: 423-241-4829

[‡]University of Maryland
Chemical Engineering Department
College Park, Maryland 20742-2111

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ZEOLITE CRYSTAL NUCLEATION AND GROWTH FROM GELS

L. Khatri[*1,2]; M. Z.-C. Hu[2]; C. J. Rawn[2]; E. A. Payzant[2]; M. T. Harris[1]; J. –S. Lin[2]; L. F. Allard[2]

[1]University of Maryland, College Park, MD 20742

[2]Oak Ridge National Laboratory, Oak Ridge, TN 37831

The mechanism(s) that govern the formation of zeolite crystals from amorphous gels need to be fully understood. Zeolites are synthesized from aqueous basic aluminosilicate precursor gels under hydrothermal conditions with temperatures ranging from 90°C-200°C. It has been indicated that the assembly process includes sequential growth of nanometer-sized amorphous gel particles to micron size crystals. This study is aimed at understanding the early-stage nucleation process of ZSM5 (MFI type) silicalite nanocrystals, using both in-situ and off-situ measurement techniques. High Temperature X-ray Diffraction, High Resolution Transmission Electron Microscopy, and Small Angle X-ray Scattering measurements give information about the arrangement of the TPA (template) molecule in the silicalite network at different time intervals and the morphology of the species formed.