

## Improvement in synthesis of ZSM-5 single crystal

# Natsumi Kamiya[1]; Koji Nishi[1]; Yoshinobu Yokomori[1]

[1] NDA

ZSM-5 is one of the most famous zeolite catalysts. However, the mechanisms of catalytic reaction on ZSM-5 remain incompletely understood. The structures of sorbate-ZSM-5 are widely studied because to clarify state of sorbate, for example toluene, naphthalene, dichlorobenzene, etc., in ZSM-5 framework. Single crystal X-ray diffraction analysis is most proper method to know structure of sorbate. As usual, large size crystals have been synthesized by Lermer's method (Lermer et al., 1985), but a great number of analcime are observed besides TPA-ZSM-5. In this study, we will report to inhibit precipitation of analcime using KOH as a mineralizer instead of NaOH.

The molar composition of the reaction mixture was largely similar to Lermer's method. The mixture was stirred intensively and 0.7 wt% of ZSM-5 seed crystals were added into vessel, then experiment was carried out in Teflon-coated autoclave at 453 K. Synthetic period was set for 48h, 72h, 96h, 120h, and 144h.

The sample after 48 h was only obtained as powder material, and the powder XRD pattern matches zeolite W. After 72 h, amounts of zeolite W were decreased in comparison with that after 48h. Silica gel spheres were formed after 96 h, and ZSM-5 should be nucleated and grown on their surface. The large ZSM-5 crystal about 100 micrometer which is suitable for single crystal X-ray study was obtained after 120 h. The morphology was cubic and it was different from the elongated prismatic crystal which obtained using established Lermer's method. Decrease in amounts of zeolite W considerably and no amorphous were observed in this condition.