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Shape-selective Methylation of 4-Methylbiphenyl to 4,4'-Dimethylbiphenyl with Supercritical Methanol over Zeolite Catalysts

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The applicability of supercritical methanol was investigated to the selective para methylation of 4-methylbiphenyl to produce 4,4'-dimethylbiphenyl, which has recently attracted much attention as a valuable monomer of thermotropic liquid crystals, engineering plastics and others. The effects of the catalysts, temperature, pressure, reaction time, initial molar ratio of methanol to 4-methylbiphenyl and initial weight ratio of catalyst to 4-methylbiphenyl were evaluated using a batch-type reactor. The combination of supercritical methanol with SAPO-11 catalyst gave an excellent product selectivity of 70-85% of 4,4'-dimethylbiphenyl at 300°C, 14-16 MPa, 0.5 h reaction time, 15-20 initial molar ratio of methanol to 4-methylbiphenyl and 0.4-0.6 initial weight ratio of catalyst to 4-methylbiphenyl. Comparing with supercritical and gaseous methanol, the selectivity of 4,4'-dimethylbiphenyl in the supercritical phase was 1.5-3.4 times higher than that in the gas phase at the same conversion of 20-50% of 4-methylbiphenyl. The methylation almost stopped around 1 h due to coke deposition on the catalyst surface.

Keywords: [Supercritical methanol](#), [Shape selectivity](#), [Methylation](#), [Zeolite catalyst](#), [Dimethylbiphenyl](#)



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