

Pervaporation of dichlorinated organic compounds through ZSM-5 zeolite membrane

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Zeolite membranes have been studied on various applications because of their unique pore structure, mechanical, chemical and biological stabilities. Pervaporation is not only an economic separation technology but also an environmentally clean technology. A hydrophobic membrane could be used to separate organic compounds from their aqueous solution. A zeolite membrane might be used for organic separation with pervaporation technique since it shows not only molecular sieve effects but also good physicochemical stabilities. ZSM-5 zeolite membranes classified as a MFI structure have been developed for organic material separation from aqueous solutions since it is known to be hydrophobic.

In this study, a thin film of ZSM-5 zeolite was prepared by the secondary-growth method where the seed crystals were spread on the inside of a porous support as crystal growing nuclei. It was used to separate dichlorinated organic compounds from an aqueous feed stream. The ZSM-5 membrane was selected for pervaporation of dichloromethane, 1,2-dichloroethane and trans-1,2-dichloroethylene from their aqueous solutions since it shows very hydrophobic properties.