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Preparation of inexpensive NaA zeolite membrane on pozzolan support at low temperature for dehydration of alcohol solutions

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Highlights

- Low-cost NaA zeolite membrane was prepared on flat pozzolan support.
- Hight-quality NaA zeolite was hydrothermally prepared by in situ crystallization.
- The prepared membrane was applied for alcohols dehydration via pervaporation.
- The membrane shows excellent performance in terms of flux and separation factor.

Abstract

In this paper, inexpensive NaA zeolite membrane was hydrothermally prepared by in situ crystallization on flat pozzolan support at low temperature, and applied for dehydration of ethanol and isopropanol solutions through pervaporation process. The thin zeolite layer was grown on seeded support via secondary growth method using molar composition of synthesis batch of Al_2O_3: 2 SiO_2: 15 Na_2O: 800 H_2O.The effect of operating parameters such as synthesis temperature and crystallization time on NaA zeolite membrane was investigated. X ray diffraction and scanning electron microscope analysis have confirmed, on the one hand, that