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Isomerization of Alkyl Naphthalene and Refining of 2-methylnaphthalene[#]

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Abstract A preparation process of 2-methylnaphthalene (2-MN) was proposed by isomerization, side-stream distillation and extractive distillation. The isomerization of alkyl naphthalene was catalyzed by acid-treated HBEA zeolites, and the 2-MN selectivity of isomerization was 92.70%. Side-stream distillation and extractive distillation were investigated by simulation, and effects of operation parameters on 2-MN were studied. Further, the simulated results were verified by experiment. Under the optimal condition, the mass fraction of 2-MN reached to 98.09% in the product, and the yield was 83.84% in refining process.

Keywords side-stream distillation, extractive distillation, isomerization, 2-methylnaphthalene, simulation, catalyst

1 INTRODUCTION

C₁₀ aromatics production has reached more than 300000 tons per year in China, of which alkyl naphthalene account for ~30%. Among alkyl naphthalene, 2-methylnaphthalene (2-MN) is quite useful as an intermediate in producing medicals such as Vitamin K and 2,6-naphthalene dicarboxylic acid (a starting material for polyethylene naphthalene (PEN) with high heat resistance and tensile strength) [1-3]. Although 1-methylnaphthalene (1-MN) has its application filed such as dyes, industrial demand for the 1-MN is much less than that of 2-MN.

Several processes for the simple separation of 2-MN from alkyl naphthalene have been reported [4], in which the mass ratio of 2-MN to 1-MN usually need be high in the raw material. Otherwise, the simple separation will comprise multiple distillations and crystallizations with low 2-MN yield, and a large amount of 1-MN production will be obtained.

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