

عنوان مقاله:

Modeling of an isothermal and non-isothermal tubular membrane reactor for conversion of synthesis gas to methanol

محل انتشار:

پنجمین کنگره بین المللی مهندسی شیمی (سال: 1386)

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خلاصه مقاله:

Production yield of methanol from syngas in a traditional fixed bed reactor at the temperature and pressure required for the optimum catalyst activity is restricted by the thermodynamic equilibrium. By selective removal of the reaction products from the catalytic reactor bed using a membrane, it is possible to improve the reaction yield. In order to investigate the effect of the presence of the membrane as a selective separation barrier on the methanol yield, the performance of a tubular membrane reactor was simulated by a mathematical model. The model was developed using differential material, energy and momentum balances and the set of describing equations were solved numerically to give the composition, temperature and pressure profile along the reactor. The model validated using the experimental data available in the literature for two kinds of zeolite membranes (methanol selective and water selective). The modeling results show that in either cases methanol yield is improved by using the membrane reactor in comparison to the traditional reactor. In addition, the yield improvement is more considerable using a zeolite .membrane with a higher permeability of methanol over water

کلمات کلیدی:

membrane- reactor- methanol- yield- zeolite

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