

عنوان مقاله:

Computational fluid dynamic analysis of catalytic isobutane dehydrogenation in a palladium membrane reactor for hydrogen production

محل انتشار:

پنجمین کنفرانس بین المللی نوآوری های اخیر در شیمی و مهندسی شیمی (سال: 1396)

تعداد صفحات اصل مقاله: 7

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خلاصه مقاله:

This study presents a 2D-axisymmetric computational fluid dynamic (CFD) to investigate the performance of Pd-based membrane reactor (MR) during isobutane dehydrogenation reaction for hydrogen and isobutene production. The proposed CFD model provides the local information of velocity, pressure and component concentration for the driving force analysis. The validation of model results was carried out by experimental data and a good agreement between model results and experimental data was achieved. In MR model, a commercial Cr₂O₃/Al₂O₃ catalyst in reaction zone was considered. The effects of some important operating parameters such as reaction temperature and reaction pressure on the performance of Pd-based MR were studied in terms of isobutane conversion and hydrogen recovery. The CFD results showed that the Pd-based MR during isobutane dehydrogenation reaction presents higher performance in terms of isobutane conversion and hydrogen recovery with respect to fixed-bed reactor (FBR), in all (the studied cases (34% isobutane conversion enhancement at 800 K

کلمات کلیدی:

CFD, Membrane reactor, isobutane dehydrogenation, Hydrogen production

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/739831>

