

## عنوان مقاله:

Modeling and Optimization of Combined Dry and Steam Reforming Process in Fluidized Bed Membrane Reactors

## محل انتشار:

هفتمین کنگره ملی مهندسی شیمی (سال: 1390)

تعداد صفحات اصل مقاله: 10

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## خلاصه مقاله:

Mathematical modeling of methane reforming process was performed by the combined reactions of steam and CO<sub>2</sub> with methane in fluidized bed membrane reactor. The model characterizes multiple phases and regions considering low-density phase, high-density phase, membrane and freeboard regions that allows for studying the reactor performance. A well-mixed catalyst pattern was employed for coupling the reactions. It has been shown that the combined effect of the membrane and reaction coupling provides opportunities to overcome equilibrium conversion limits and help to achieve higher conversion of methane. The influence of some key parameters on the reactor performance including temperature, pressure, S/C (i.e. steam to methane molar feed ratio) and CO<sub>2</sub>/C (i.e. CO<sub>2</sub> to methane molar feed ratio) have been investigated. Thereafter, genetic algorithm was employed to find optimal operating conditions of the reactor. Steam reforming is also simulated in selected optimal operating conditions and the results are compared to those of combined reforming. The comparison reveals the superiority of combined reforming process in terms of methane conversion, catalyst activity and H<sub>2</sub>/CO ratio (close to unity) while steam reforming process demonstrates potential to produce higher amounts of pure hydrogen

## کلمات کلیدی:

Combined reforming; Fluidized bed Reactor; Mathematical modeling; optimization

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/341077>

