

عنوان مقاله:

Simulation of integrated purification systems for hydrogen production in methanol steam reforming process

محل انتشار:

فصلنامه هیدروژن و پیل سوختی ایران، دوره 10، شماره 3 (سال: 1402)

تعداد صفحات اصل مقاله: 16

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خلاصه مقاله:

Recently, the use of clean energy has become the interest topic for researchers. Hydrogen has attracted the attention of researchers and industries as an alternative energy. Among the sources that exist for hydrogen production, methanol fuel is considered as an attractive feedstock for hydrogen production due to its advantages. The output stream from the methanol steam reforming reactor contains some carbon monoxide, and considering that carbon monoxide leads to fuel cell catalyst damage, its concentration should be reduced. In the present work, the focus is on the design and simulation of the purification system of the methanol steam reforming process. Therefore, in the present study, in order to reduce the concentration of carbon monoxide output of the reformer, the PROX unit was used. In this system, Pt/Al<sub>2</sub>O<sub>3</sub> catalyst was used to increase the reaction rate. Aspen plus V11.0 software was used to simulate the PROX system. The results showed that carbon monoxide was completely removed from the system during the reactor. Next, in order to increase the concentration of hydrogen, the PSA column including activated carbon absorber was used as a purification system. Simulation and design of PSA process were done in Aspen adsorption V11.0 software. Hydrogen purity of 99.9915% was obtained in the output stream from the PSA column. To validation of the results obtained from the simulation, the present work was compared with the study of Abdeljaoued and et al [30]. The results obtained from the simulation showed the acceptable error percentage with the results of the article.

کلمات کلیدی:

Methanol-Steam Reforming, Hydrogen production, Purification system, PSA process, Simulation

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