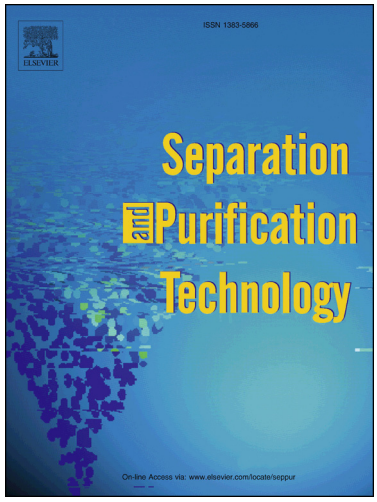

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Ayub Golmakani, Shohreh Fatemi, Javad Tamnanloo

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Investigating PSA, VSA, and TSA methods in SMR Unit of Refineries for Hydrogen Production with Fuel Cell Specification

Ayub Golmakani, Shohreh Fatemi[1], Javad Tamnanloo

School of Chemical Engineering, College of Engineering, University of Tehran, P.O. Box: 11365-4563, Tehran, Iran

Abstract

In this paper a robust and reliable process is proposed for purification of hydrogen from syngas to approach to the specification of fuel cell application (H_2 purity>99.99, CO impurity <0.2 ppm). Three cyclic adsorption processes; Pressure Swing Adsorption (PSA), Vacuum Swing Adsorption (VSA) and Temperature Swing Adsorption (TSA), were proposed, modeled and optimized, comparatively, for hydrogen purification. The Response Surface Methodology (RSM) was implemented for statistical investigation and optimization of operating conditions. In all cases two-layered adsorption bed of activated carbon and 5A zeolite was considered in cyclic adsorption process. The effect of bed length, purge to fe

[1]Corresponding Author. Tel.: +98 21 61112229; fax: +98 21 66957784.

E-mail address: shfatemi@ut.ac.ir (S. Fatemi).