

공기로부터 고순도 산소 생산을 위한 PVSA 공정 최적화 연구

지정근, 김민배¹, 이상훈², 문홍만², 이창하^{1,*}
삼성전자주식회사 반도체총괄 메모리사업부;
¹연세대학교 화학공학과;
²대성산업가스(주) 초저온 연구소
(leech@yonsei.ac.kr*)

A three-bed PVSA process with two equilibrium beds and one kinetic bed was developed to overcome the 94% O₂ purity restriction inherent to air separation in the adsorption process. To produce 97+ % and/or 99+ % purity O₂ directly from air, the PVSA process was executed at 0.33–0.45 to 2.5 atm. In addition, the effluent gas from the CMS bed to be used for O₂ purification was backfilled to the zeolite 10X bed to improve its purity, recovery and productivity in bulk separation of the air.

In this study, to improve and optimize the cyclic performance of three-bed PVSA process, a parametric study was also done by experimental and theoretical works. The optimization of PR and AD step times of CMS bed was executed to improve both the performance of equilibrium and kinetic separation beds. As a consequence, the high purity O₂ of around 97% with high recovery of around 75% and the productivity of around 5.8 x 10⁻⁵ cm³/g·sec was produced at properly determined operating condition.