Optimal Design of a Cryogenic Distillation Column for Hydrogen Isotope Separation

엄재정, 박담대, 이종민†
서울대학교
(jongmin@snu.ac.kr†)

This paper presents the development process of an optimal design of a cryogenic distillation column for hydrogen isotope separation system (ISS). In ISS, a packed distillation column is utilized in cryogenic temperature to separate hydrogen isotopes. Product quality constraints must be satisfied and minimization of tritium, a hydrogen isotope, is of great interest. The packed distillation column was modeled as hypothetical trays. The distillation column was formulated as mathematical program with equilibrium constraints (MPEC) to describe the change in number of phases. Pyomo, an open-source optimization modeling language was utilized for optimization. Peng-Robinson equation of state model was implemented by an equation-oriented approach. A packed column holdup model was adopted in each hypothetical tray. Non-flooding condition in each hypothetical tray was added to constraints.