

황산-HIx 계 HIx 농축장치를 적용한 SI 공정 모사

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The preliminary flowsheet of Sulfur iodine (SI) cycle with an osmotic concentration of HIx solution has been developed. The flowsheet of the SI cycle employs key components as follows: a precipitator to recover excess iodine dissolved in the hydriodic acid solution, a H₂O semi-permeable membrane cell to break through the azeotrope of the HI/I₂/H₂O ternary solution, a multi-stage HI distillation column to generate highly concentrated hydriodic acid vapor as a top product of the column, a membrane reactor to decompose hydrogen iodide. Effects of an operation parameter of HI distillation ratio in the distillation column on thermal efficiency were investigated based on heat/mass balance. As the HI distillation ratio in the HI distillation column increased, the mole flow rate in the HI decomposition section decreased and the thermal efficiency increased. The thermal efficiency of the proposed SI process has also been evaluated and predicted as 39.4%.