

Sensitivity analysis of HIx distillation column based on an electrolyte thermodynamic model

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The Sulfur – Iodine cycle (SI cycle) produces hydrogen using residual heat energy from the nuclear power plant. HI is decomposed into hydrogen and iodine at SECIII of SI cycle. Distillation column is used to separate HI from HIx (mixture of HI-I<sub>2</sub>-H<sub>2</sub>O) prior to the decomposition. HI distillation column analysis is very important, since HIx distillation determines the efficiency of the entire process. In order to analyze distillation columns, a thermodynamic model is required. Due to HIx electrolyte characteristics in aqueous solution, an electrolyte model should be applied. In this work, distillation column regulation measures were estimated by using electrolyte NRTL combined with cubic EOS model to analyze HIx distillation column. Sensitivity on controlled variables was evaluated and a control strategy was derived on reflux ratio and reboiler heat duty.