

Property Correlation and Heat Exchanger Design for Section III of Sulfur-Iodine (SI) Process

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The Sulfur - Iodine cycle (SI cycle) produces hydrogen using residual heat energy from the nuclear power plant. SI cycle consists of three sections each for Bunsen reaction (Section I), H<sub>2</sub>SO<sub>4</sub> decomposition (Section II), HI decomposition (Section III). In Section III, distillation column for separating HI from HIx (mixture of HI-I<sub>2</sub>-H<sub>2</sub>O) is very important, since HIx distillation determines the efficiency of the entire process. Section III requires well-designed heat exchangers to increase energy efficiency, especially prior to a distillation column. In this work, we collected and calculated mixture properties such as density, viscosity, heat capacity and thermal conductivity required for modeling and applied a commercial simulation tool to design a heat exchanger for a feed to Section III.