

## Study on the Influence of the Cooling Rate and Surface Area on the Efficiency of the Iodine Separation

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The Sulfur–Iodine thermochemical cycle (SI cycle) for water decomposition is one of the most promising processes to generate sufficient amount of hydrogen from nuclear energy. The formerly announced section III in SI cycle, which consists of concentration, decomposition and separation of HIx mixture, is the most crucial section because this section determines the hydrogen product yield of SI cycle. To decrease overall energy consumption, the iodine content in HIx mixture has to be reduced before this stream enters the cathode part of EED. In this work, we have treated about whether it is possible to increase the separation efficiency by controlling the cooling surface area. Cooling lines with different contact areas are prepared. Surface areas of the cooling lines are respectively 1201.09 cm<sup>2</sup>, 821.60 cm<sup>2</sup> and 568.61 cm<sup>2</sup>. Experimental result has shown that additional 15% of iodine was crystallized when cooling with the cooling line with the largest surface area, compared with the result without any a cooling line. This result indicated that the separation efficiency can be improved with respect to the surface area of the cooling line.