

Separation of Iodine by Crystallization from HIx Mixture in SI Hydrogen Generating Process

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The formerly announced SI cycle is one of the most prospective processes to produce sufficient amount of hydrogen. In this process, section III, which is consists of separation, concentration and decomposition of HIx mixture, is the most critical section because this section determines the hydrogen product yield of SI cycle. In this work, to reduce overall energy consumption, two conditions have to be satisfied. Mainly, the Iodine content in HIx mixture has to be reduced before this stream enters into the cathode part of EED. At the same time, more than 60 per cent of the fed HI has to be recovered in the light phase. Therefore, we recommend the crystallization process of the solid iodine as a separation method. We have prepared the solid iodine (I₂, 99%) and HI (Hydroiodic acid, 57%). The boiling water above 353K is introduced to the system to liquefy HIx mixture. Then, the cooling water is used to lower the operating temperature to allow the crystallization process. Conducting follow-up experiment, the composition of light phase is measured with auto titration. Finally, we have provided a design basis of the crystallization process for section III.