

Preliminary Thermohydraulic Analysis for I₂ Crystallizer Development in SI Hydrogen Production Process

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The SI cycle process is configured as Section I, II, and III. In Section I, Bunsen reaction occurs and produces two acid solutions, one of which contains excess amounts of iodine to destroy the homogeneity between the solutions. The unreacted I₂ is sent to Section III where hydrogen is produced by decomposing HI from HIx mixture. The excess I₂ entered Section III could be a burden on the decomposition process and the removal of I₂ is taken into consideration. A crystallization method is readily applicable for the purpose and a crystallization process was developed. The process takes place by a thermal gradient between a heat sink and the process flow. Therefore, it is very important to understand temperature profiles and flow conditions for the continuous equipment development. In this work, as a preliminary approach for a crystallizer development thermohydraulic behavior was analyzed with respect to the imposed temperature and the number of cooling sources. It was concluded that the significant temperature difference was required to cool down the process flow to the crystallization temperature in a flow system.