Corrosion of acetic acid solution containing halogen ions under high temperature

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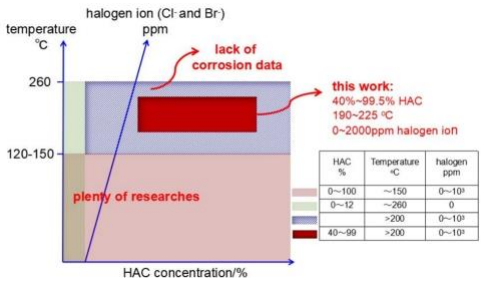
Abstract Acetic acid (HAC) is an important chemical, which is widely used in fine chemical industry as solvent and reactant. However, HAC can cause corrosion of metal materials and thus lead to failures of metallic equipment and pipelines, threatening the safety of industrial production and operation workers. In this work, we developed a high-temperature HAC distillation process to obtained the product with 99.5% HAC from the raw materials with 40% HAC and 2,000ppm halogen ions (Cl^- and Br^-), and the temperature of distillation column bottom was high up to 190 ^oC. This process had a highly corrosion to metal materials, which was evaluated in this work. Results show that 40%HAC with 2,000ppm halogen ions had a highly corrosion to stainless steels 904L and 254SMo under 190 ^oC, and also exhibited corrosion to Hastelloy C-276 with a corrosion rate of 0.13mm/a. Unlike these three alloys, pure titanium TA2 and its alloy TA10 had a better corrosion resistance with a corrosion rate < 0.01mm/a under both concentrations of 40% and 99.5%. However, the corrosion rates of TA2 increased rapidly to higher than 0.01mm/a and when temperature raised from 190 ^oC to 225 ^oC, and the higher corrosion rate in the first few dozen hours was observed.

Keywords metal corrosion, acetic acid, stainless steel, titanium, high temperature, halogen ion



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