

## Electrochemical corrosion behavior of 304 in crystallization mother liquor of taurine at different pHs

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**Abstract** The storage of crystallization mother liquor is usually accompanied by the crystallization on the inner wall and the bottom due to the change in environment temperature, which could lead to localized pH changes at the metal-solution interface and thereby result in corrosion of metal and thinning of the inner wall. In this work, we studied the corrosion of 304 stainless steel by the crystallization mother liquor of taurine under different pHs. Results show that the passivation-activation state of 304 was dependent to the pH of the crystallization mother liquor. 304 was in the state of activation when the pH was less than 3.5, and it exhibited passivation behavior with the pH in the range between 4.0 and 9.0. when pH continued to raise, 304 re-failed to passivate. The corrosion current densities in the neutral pH zone ( $4.0 < \text{pH} < 9.0$ :  $10^{-6}$  A/cm<sup>2</sup>) were less than those in the acidic zone ( $\text{pH} < 3.5$ :  $10^{-5}$  A/cm<sup>2</sup>). With continually increasing in alkalinity of the liquor, the corrosion current density began to increase. Thus, maintaining the mother liquor in the appropriate range of pH is conducive to the passivation of 304 and further inhibits the corrosion behavior.

**Keywords** metal corrosion, pH, 304 stainless steel, crystallization mother liquor