

A Study on the Pit Growth Kinetics of Inconel Alloy 600 in Cl^- -Ion Containing Solution at Temperatures 25° to 150°C by Analysis of Current Transients in View of Stochastic Theory

확률 이론의 관점에서 25° 에서 150°C 사이의 염화이온 함유수용액에서 인코넬 합금 600에서 구한 전류추이 곡선의 해석에 의한 핏트의 성장 속도론에 대한 연구

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The kinetics of pit growth of Inconel alloy 600 in aqueous $0.1\text{M Na}_2\text{S}_2\text{O}_3 + 0.1\text{M NaCl}$ solutions has been studied as a function of solution temperature in view of stochastic theory by using potentiostatic current transients obtained from the abrading electrode experiments using new abrading set-up specially designed. Potentiostatic current transients obtained from the moment just after interrupting the abrading action revealed that the rate of pit growth decreased with solution temperature over the whole applied potential range. Since the stable pits already grow in the repassivation process at higher solution temperature, it can be deduced that the rate of pit growth at higher solution temperature is lower than that at lower solution temperature due to the pre-existing stable pits in the early stage of repassivation. In addition, the kinetics of pit growth with respect to solution temperature is discussed in terms of change in fractal dimension of the pits formed on the electrode surface and in terms of changes in the shape and scale parameter derived from the stochastic theory.

References

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