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New Aspects on Passivation and Localized Corrosion Behavior of Austenitic and Duplex Stainless Steels in HCl Solution

Wen-Ta Tsai [a, b,*], **Li Pao** [a]

[a] *Department of Materials Science and Engineering, National Cheng Kung University, Tainan, 70101, Taiwan*

[b] *NCKU Research and Development Foundation, Tainan, 70101, Taiwan*

*E-mail address: wttsai@mail.ncku.edu.tw

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Due to the differences in chemical composition and crystal structure, the passivation and localized corrosion behaviors of an austenitic stainless steel differs from those of a duplex stainless steel (DSS). Furthermore, the partition of chemical composition in the constituent phases (namely ferrite and austenite) also leads to selective corrosion in a DSS. In this study, the conditions in terms of temperature and solution concentration for the passivation and localized corrosion (including pitting corrosion and selective corrosion) of 316L SS and 2205 DSS in HCl solutions are distinguished and characterized by employing both electrochemical investigation and morphological inspection.