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The corrosion behaviors of FeCoNiMo high-entropy alloy

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This equimolar FeCoNiMo alloy was designed from the high-entropy alloy concept. The granular FCC-structured FeCoNi alloy had a good corrosion resistance in acidic solutions, but its soft manner limited its applications. Therefore, this study added molybdenum into FeCoNi alloy to improve its hardness. This study investigated the microstructures and hardness of FeCoNiMo alloy, the polarization behaviors of FeCoNiMo alloy in 1M deaerated hydrochloric acid and 1M sodium chloride solutions were also tested. Results indicated that the FeCoNiMo alloy had a dendritic microstructure, also had higher hardness than that of FeCoNi alloy. Therefore, addition of molybdenum not only changed the microstructure of granular FCC-structured FeCoNi alloy, but also enhanced the hardness of the alloy. Additionally, the polarization curves of FeCoNiMo alloy indicated that corrosion resistance of this alloy in these two solutions was better than that of commercial 304 stainless steel. This was contributed by the molybdenum, because molybdenum could improve the localized corrosion resistance. Also, addition of molybdenum changed the pitting morphology from a deep type to a shallow one. All of these indicated that the FeCoNiMo alloy had a good commercial application potential, especial in the solutions with chlorine ions.

Biography

Chun-Huei Tsau has been graduated from Department of Materials Science and Engineering, National Tsing Hua University, Hsinchu, Taiwan. Currently, he is a Professor of Institute of Nanomaterials, Chinese Culture University, Taipei, Taiwan. His research recently focuses on the development of corrosion resistant high-entropy alloys.

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