Corrosion characteristic of Cu-10Ni-Fe_x in 3.5 % NaCl

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doi: 10.20964/2018.12.11

Received: 8 August 2018 / *Accepted:* 13 September 2018 / *Published:* 5 November 2018

The corrosion characteristic of Cu-10Ni-Fe_x alloys (x=0.84, 1.26, 1.76) in 3.5 % NaCl solution was investigated by using electrochemical impedance spectroscopy, potentiodynamic polarization curve, X-ray Diffraction and X-ray photoelectron spectroscopy. The results showed that the order of corrosion resistance is Cu-10.52Ni-1.26Fe > Cu-10.44Ni-0.84Fe > Cu-10.48Ni-1.76Fe. Fe exists in the form of FeOOH and FeO in the product films, whilst Ni exists in the form of NiO, Ni(OH)₂, and metallic Ni in the product films. FeOOH promotes the enrichment of the Ni content and the formation of NiO. The product film of Cu-10.52Ni-1.26Fe with the best corrosion resistance contained the highest content of FeOOH. In addition, the mechanism of FeOOH on the corrosion resistance has been discussed.

Keywords: Fe element; corrosion resistance; Cu-Ni alloy; corrosion product film; Electrochemical impedance spectroscopy

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