Preparation and Corrosion Resistance of Ni-W-Y$_2$O$_3$-ZrO$_2$ Nanocomposite Coatings

Qingwei Niu$^1$, Zili Li$^1$*, Xiaofeng Yan$^2$, Guodong Liu$^3$, Bingying Wang$^3$

$^1$ College of Pipeline and Civil Engineering, China university of petroleum (East China), Qingdao, China, 266580
$^2$ The Sixth Gas Production Plant in Changqing Oilfield, Xi’an, China, 710018
$^3$ College of Mechanical and Electronic Engineering, China university of petroleum (East China), Qingdao, China, 266580

*E-mail: zilimenhuzu@163.com

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Composite coatings containing Y$_2$O$_3$ and ZrO$_2$ nanoparticles were prepared by the composite electrodeposition technique under ultrasonic stirring and electromagnetic stirring. The microstructure of the nanocomposite coatings was observed by scanning electron microscopy. In addition, the microhardness of the nanocomposite coatings was tested. Electrochemical polarization curves and AC impedance spectra of the nanocomposite coatings were tested in 3.5 wt% NaCl solution to study the corrosion resistance. The experimental results showed that the composite coatings prepared under ultrasonic stirring were compact, fine grain, and had no cracks. Compared to Ni–W alloy coating, the addition of nanoparticles Y$_2$O$_3$ and ZrO$_2$ significantly improved the microhardness and corrosion resistance of the composite coatings.

Keywords: Composite coating; Y$_2$O$_3$; ZrO$_2$; Nanoparticles; Corrosion resistance

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