

Accepted Manuscript

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PII: S0925-8388(17)32834-7

DOI: [10.1016/j.jallcom.2017.08.105](https://doi.org/10.1016/j.jallcom.2017.08.105)

Reference: JALCOM 42862

To appear in: *Journal of Alloys and Compounds*

Received Date: 28 June 2017

Revised Date: 9 August 2017

Accepted Date: 11 August 2017

Please cite this article as: C. Wang, L. Shen, M. Qiu, Z. Tian, W. Jiang, Characterizations of Ni-CeO₂ nanocomposite coating by interlaced jet electrodeposition, *Journal of Alloys and Compounds* (2017), doi: 10.1016/j.jallcom.2017.08.105.

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Characterizations of Ni-CeO₂ nanocomposite coating by interlaced jet electrodeposition

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Abstract: The properties of conventional nickel coatings were improved by preparing Ni-CeO₂ nanocomposite coatings by jet electrodeposition. On the basis of these results, a new method involving discontinuous cathode rotation and interlaced deposition was proposed. The effects of nanoparticle (NP) concentration and interlacing technology on the surface quality, NP content, and microstructure and corrosion resistance of the resulting composite coatings were investigated. The microstructure and surface morphology were characterized by X-ray diffraction (XRD) and field emission scanning electron microscopy (FESEM), the corrosion resistance was tested by electrochemical workstation. The results showed that, adding an appropriate amount of CeO₂ NPs, effectively improved coating surface quality and reduced defects, such as cellular bulges, micropores, and microcracks. The corrosion current density was reduced from 1.612 to 0.459 $\mu\text{A}\cdot\text{cm}^{-2}$, compared to pure Ni, which indicated that corrosion resistance was clearly improved. With the introduction

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