Facile fabrication of superhydrophobic cerium coating with micro-nano flower-like structure and excellent corrosion resistance

Cansen Liu, Fenghua Su, Jizhao Liang, Ping Huang

PII: S0257-8972(14)00742-7
DOI: doi: 10.1016/j.surfcoat.2014.08.032
Reference: SCT 19666

To appear in: *Surface & Coatings Technology*

Received date: 29 May 2014
Accepted date: 10 August 2014

Please cite this article as: Cansen Liu, Fenghua Su, Jizhao Liang, Ping Huang, Facile fabrication of superhydrophobic cerium coating with micro-nano flower-like structure and excellent corrosion resistance, *Surface & Coatings Technology* (2014), doi: 10.1016/j.surfcoat.2014.08.032

Facile fabrication of superhydrophobic cerium coating with micro-nano flower-like structure and excellent corrosion resistance

Cansen Liu, *Fenghua Su*[*], *Jizhao Liang*, *Ping Huang*

School of Mechanical and Automotive Engineering, South China University of Technology, Guangzhou 510640, China

Abstract: Corrosion resistant and superhydrophobic cerium (Ce) coating is fabricated by a one-step electrodeposition process. The Ce coating deposited at 50 V for 10 min displays superhydrophobicity with a contact angle of 162° and a sliding angle less than 4°, which is attributed to its micro-nano flower-like structure and the cerium myristate produced on its surface. The potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) tests show the as-prepared superhydrophobic coating has excellent corrosion resistance that can provide effective protection for the substrate. The corrosion resistance of the superhydrophobic surface is closely related to their wettability. Moreover, the superhydrophobic Ce coating has good chemical stability because it exhibits low corrosion current density in various corrosive solutions except the solution with strong alkalinity. Finally, it is confirmed that the as-prepared superhydrophobic surface has low surface energy and self-cleaning ability. It is believed that the facile and low-cost method offers an effective strategy and promising industrial applications for fabricating superhydrophobic surfaces consisting of rare earth element.

Keywords: Superhydrophobic surface; Cerium coating; Corrosion resistance; Electrodeposition

[*] Corresponding author. Tel./fax: +86 20 87112341
E-mail address: fhsu@scut.edu.cn