Ag and CoFe$_2$O$_4$ co-sensitized TiO$_2$ nanowire for photocathodic protection of 304 SS under visible light

Zhehua Wen$^{1,2,4,a}$, Ning Wang$^{2,3,4,a}$, Jing Wang$^{2,4,*}$, Baorong Hou$^{1,2,4,*}$

1 Institute of Marine Science and Technology, Shandong University, Qingdao, 266237, China.
2 Key Laboratory of Marine Environmental Corrosion and Bio-fouling, Institute of Oceanology, Chinese Academy of Sciences, Qingdao 266071, China.
3 University of Chinese Academy of Sciences, Beijing 100049, China.
4 Open Studio for Marine Corrosion and Protection, Qingdao National Laboratory for Marine Science and Technology, Qingdao, 266237, China.

*E-mail: baorongh@163.com, jwang0501@126.com
a Equal contributions to this work.

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Ag and CoFe$_2$O$_4$ co-sensitized TiO$_2$ nanowire (NW) structures were fabricated by photoreduction deposition and hydrothermal methods. The morphology, chemical composition and optical absorption capabilities of the nanocomposites were systematically investigated by scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS) and UV–visible absorption spectra methods. The photo-induced open circuit potential (OCP) and photocurrent density were measured under visible light to evaluate the photocathodic protection effects of the nanocomposites for 304 SS in the presence and absence of illumination. The results indicated that the deposition of Ag and CoFe$_2$O$_4$ nanoparticles (NPs) shifted the light absorption of TiO$_2$ to the visible light region and enhanced the separation efficiency of the photogenerated charges. The nanocomposite exhibited more efficient photocathodic protection for 304 SS compared with pure TiO$_2$ under visible light.

Keywords: TiO$_2$; CoFe$_2$O$_4$; Ag; photocathodic protection

FULL TEXT

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