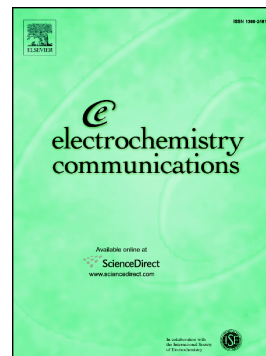


## Accepted Manuscript

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PII: S1388-2481(18)30069-9  
DOI: doi:[10.1016/j.elecom.2018.03.010](https://doi.org/10.1016/j.elecom.2018.03.010)  
Reference: ELECOM 6175  
To appear in: *Electrochemistry Communications*  
Received date: 22 March 2018  
Revised date: 24 March 2018  
Accepted date: 29 March 2018

Please cite this article as: Qingyang Li, Wei Li, Maozhong An , Sunlight induced photoelectrochemical anticorrosion effect of corrosion product layers on electrogalvanized steel in simulated seawater. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. *Elecom*(2018), doi:[10.1016/j.elecom.2018.03.010](https://doi.org/10.1016/j.elecom.2018.03.010)

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# Sunlight induced photoelectrochemical anticorrosion effect of corrosion product layers on electrogalvanized steel in simulated seawater

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**Abstract:** It is demonstrated that the oxides and corrosion product layers not only endured the attack from aggressive environments, but also provided an additional photogenerated cathode protection to electrogalvanized steel in simulated seawater under simulated sunlight illumination. The corrosion product layer, which is composed of ZnO, Zn(OH)<sub>2</sub>, Zn<sub>2</sub>(OH)<sub>2</sub>CO<sub>3</sub> and Zn<sub>5</sub>(OH)<sub>8</sub>Cl<sub>2</sub>•H<sub>2</sub>O provided approximately 30% better corrosion protection to zinc coating under sunlight illumination than the situation in darkness according to the Stern–Geary resistance results. The responsible mechanism is due to the fact that the ZnO layer could produce photoelectrons which are transferred directly to the substrate, thereby providing a cathodic protection to electrogalvanized steel under sunlight illumination.

**Keywords:** Corrosion; Electrodeposited zinc; Corrosion product layer;

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