

***N*-Heterocyclic Carbene as a Primer Coating for Corrosion Protection on Iron**

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Abstract:

The development of highly-stable coatings on iron is essential for mitigating corrosion formation. Herein, we demonstrate that self-assembled monolayer of *N*-Heterocyclic Carbene (NHC) can be electrodeposited on iron foil and function as a binder for a secondary, cross-linked polymer network coating. The dual layer coating, constructed of NHC monolayer and polymer film, as a primary and secondary coating, respectively, effectively prevents corrosion formation with a protective efficiency of 99.6 ± 0.2 %, as determined by polarization measurements in 3.5 wt% NaCl solution. Spectroscopic analysis identified the formation of chemical interaction between the NHC monolayer and the polymer film. A combined electrochemical and Raman spectroscopy study was performed to confirm NHC deposition and the stability on the iron surface.