

Chris Vetter, Xiaoning Qi, Alice C. Harper and Victoria Johnston Gelling.
“Polypyrrole/Aluminum Flake Pigmented Coatings for Corrosion Inhibition.” *Proceedings of the 17th International Corrosion Congress*, Oct. 6-10, 2008, Las Vegas (2009), 11 p.

Abstract. Early research into the use of Electroactive Conducting Polymers (ECPs) as a corrosion inhibitor showed that the ECPs can provide corrosion inhibition to various substrates. No matter the substrate, most currently successful synthetic practices are carried out by electrochemical methods. Although beneficial for characterization and mechanism studies, electrochemical methods are difficult to apply at the large scale. On the other hand, chemical oxidation methods are relatively easy to scale into industrial proportions. Unfortunately, the ECPs formed in this manner often display poor film quality, powdery product, and low solubility. In order to facilitate industrial application, this study examines polypyrrole (PPy) coated aluminum flake, acting as a pigment in binder system, synthesized through a new aqueous chemical oxidation process. The resulting flakes were incorporated into a standard epoxy coating at varying pigment volume concentrations with the end goal of producing a conducting film capable of providing corrosion inhibition. To investigate the coatings, electrochemical impedance spectroscopy (EIS) was used to characterize the effects of the pigment volume concentration (PVC) on the impedance of the coatings. Additionally, the nature of the polypyrrole and surface morphology of the hybrid were characterized using a density test, a scanning electron microscope (SEM) and conductive atomic force microscopy (c-AFM).

Keywords: Polypyrrole, Aluminum, Corrosion Inhibition