

A MULTIFUNCTIONAL SMART COATING FOR AUTONOMOUS CORROSION CONTROL

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ABSTRACT

Corrosion is a destructive process that often causes failure in metallic components and structures. Protective coatings are the most commonly used method of corrosion control. However, progressively stricter environmental regulations have resulted in the ban of many commercially available corrosion protective coatings due to the harmful effects of their solvents or corrosion inhibitors. This work concerns the development of a multifunctional, smart coating for the autonomous control of corrosion. This coating is being developed to have the inherent ability to detect the chemical changes associated with the onset of corrosion and respond autonomously to control it. The multi-functionality of the coating is based on micro-encapsulation technology specifically designed for corrosion control applications. This design has, in addition to all the advantages of other existing microcapsules designs, the corrosion controlled release function that allows the delivery of corrosion indicators and inhibitors on demand only when and where needed. Corrosion indicators as well as corrosion inhibitors have been incorporated into microcapsules, blended into several paint systems, and tested for corrosion detection and protection efficacy.