

142aa Hydrothermal Synthesis and Corrosion Resistance of Vanadium Zsm-5 Films

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ZSM-5 coatings have been shown to be remarkably corrosion resistant in acids, bases and pitting-aggressive solutions [1-2]. Vanadium compounds are versatile corrosion inhibitors which are used to protect engineering materials. In ferritic stainless steels, V additions have been observed to increase the pitting potential measured in 3.5% NaCl solution [3]. In this study, we introduced vanadium into ZSM-5 coating synthesis and attempt to hence corrosion resistance and self-healing of as-synthesized V-ZSM-5 coatings. The coatings were characterized by XRD, SEM, EDX, polarization measurement, and shown to be highly corrosion resistant. The synthesis parameters (vanadium source, V/Si ratios, Na/Si ratios in the starting material) have been optimized in order to control the morphological characteristics and enhance their corrosion protection for aluminum alloys. Na/Si ratios were found to play a great role in the coating formation and their corrosion resistance. The V-ZSM coatings demonstrated good corrosion protection accompanied with released the vanadium. Under soaked in NaCl (0.856M) solution for some time (>12hrs), the scratched coatings showed much lower corrosion current than unscratched ones. The vanadium ZSM-5 films can potentially serve as an environmentally friendly, alternative corrosion-resistant coating for aluminum alloys.

Reference

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