عنوان مقاله:

Scanning Electrochemical Microscopy of Epoxy/Amine Nanostructured Self-healing Coatings

محل انتشار:

نهمین کنفرانس و نمایشگاه بین المللی مهندسی مواد و متالورژی ایران و چهاردهمین همایش ملی مشترک انجمن مهندسی متالورژی و مواد ایران و انجمن ریخته گری ایران (سال: 1399)

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خلاصه مقاله:

Self-healing was achieved by synthesizing epoxy coatings that contain dual micro/nanocapsules; epoxy and amine. Both types of capsules were embedded into epoxy matrix. When cracks were created and started to grow in the coating, the micro/nanocapsules near the crack were ruptured and released their contents. As a result of curing reaction between released curing agents (epoxy and amine), healing of the cracked sites was completed. The coatings containing loaded micro/nanocapsules were applied on carbon steels and their self-healing behavior was investigated using scanning electron microscopy (SEM) observation and scanning electrochemical microscopy (SECM) at different capsules concentration: 5, 10, 15 and 20 wt%. SECM measurements allowed us to evaluate the local corrosion activity at the artificial defect on the coatings which was deliberately introduced into it. Both the negative feedback and redox competition modes were operated. The results confirmed the physical repair of the coating in the defect leads to a recovery of the local barrier properties of it and protection of coating sample after .healing process

کلمات کلیدی:

Micro/nanocapsules, Self-healing coating, Epoxy, Amine, SECM