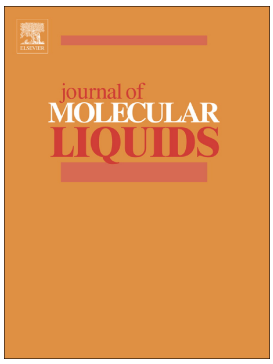

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Potential use of smart coatings for corrosion protection of metals and alloys: A review

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Abstract

Development of a new environmentally safe coating for corrosion protection of metallic surfaces attracted great interest in material science through the past few years. Smart self-healing coatings showed promising corrosion protection of metals and alloys in different technological applications due to releasing the active agents of the coat in a controllable manner for preventing cracks propagation in the protective coat. These coatings possess passive matrix functionality and actively responds to changes in the local environment which make it prompted great interest from material scientists. Smart coatings are made of responsive materials containing unique chemical, physical, mechanical and electrical characteristics. These smart coating are response and interactive with the different environmental changes such as pressure, heat and chemical effects. The smart coatings are generally classified in the basis of preparation techniques, functional and reactive components and their uses and applications. Typical coatings include: self-healing, self-cleaning, microcapsule healing and anticorrosion coatings. In the process of protection of metallic substrates, smart coatings have multi tasks such as sensing, protection and healing. This review aims to highlights the most recent advances about smart coatings with self-healing properties. Preparation of the different smart coatings and its application for different substrates is also reviewed.

Key words: Corrosion protection, smart coatings; self-healing, controlled release