Low Temperature Curing of Hydrogen Silsesquioxane Surface Coatings for Corrosion Protection of Aluminum

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Hydrogen Silsesquioxane (HSQ) has shown to be a promising precursor for corrosion protective glass coatings for metallic substrates due to the excellent barrier properties of the films, especially in the application of protective coatings for aluminum in the automotive industry where high chemical stability in alkaline environments is required. The coatings have been successfully applied to stainless steel substrates. However the traditional thermal curing of HSQ involves heating to elevated temperatures, which are beyond those applicable for most industrial applications of aluminum. In this study low temperature processes are tested and evaluated as possible alternatives to the traditional high temperature cure. Thin HSQ films are deposited on silicon wafers to model the degree of curing induced by the low temperature methods in comparison to thermal curing. Furthermore, the coatings are applied on aluminum substrates to evaluate the adhesion and corrosion resistance of the films.

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