

Characterization of Silicone – Acrylic Based Resin on Mild Steel Panels

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Abstract

The properties of silicone-acrylic based resin have been characterized. Different portions of silicone resin ranging from 10% to 60% have been added into acrylic resin. The mixed resins were then applied on mild steel panels by brushing method. The coated panels are allowed to dry under ambient condition for 7 days before being characterized by electrochemical impedance spectroscopy (EIS), Scanning electron microscopy (SEM), mechanical test and potential-time measurements technique (PTM). The composition with at least 30% silicone content showed the best performance.

By selecting the best silicone-acrylic composition (30% Silicone resin and 70% acrylic resin) resin have been selected to made paint. A series of paint consist of silicone acrylic resin were designated with pigment volume concentration (PVC) ranging from 10 to 60% using titanium dioxide pigment. The thickness of the tested coatings was similar. For each coating the dependence has been determined by electrochemical measurements, potential – time measurement and also with SEM observation. The SEM micrographs, porosity characteristic and PTM measurements of the samples are shown in Fig. 1, Fig. 2 and Fig. 3. , respectively. The results showed that the coatings with approached to critical pigment volume concentration (CPVC) showed the best performance against high temperature and corrosion attacks.

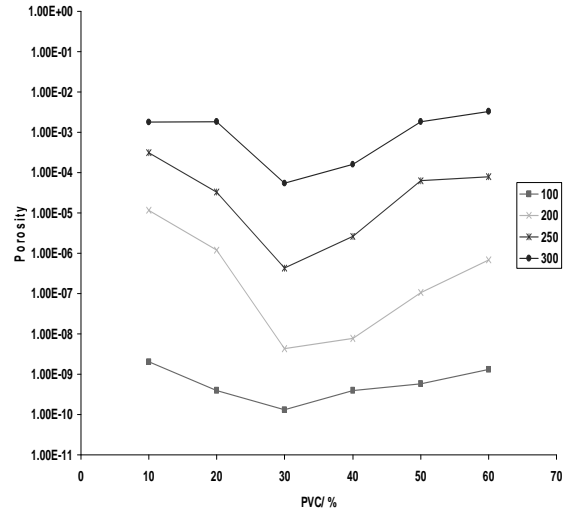


Fig. 2: Porosity of sample Si30 after being subjected to various heated treatment and exposed to 3% NaCl solution for 30 days.

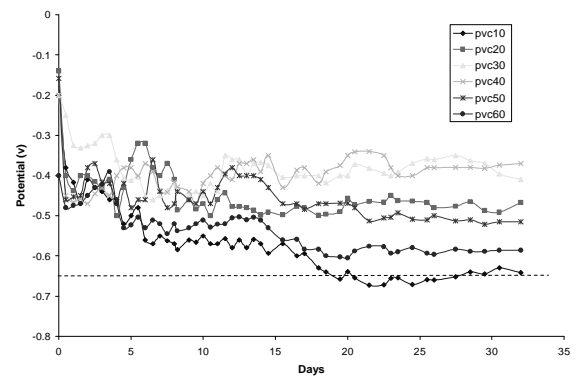


Fig. 3: Potential-Time measurements of samples Si30 with different PVC value in 3% NaCl solution for 30 days.

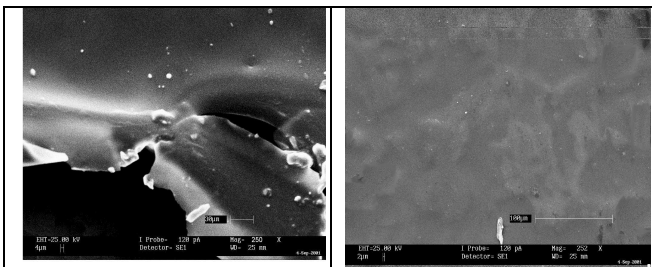


Fig. 1: SEM micrographs of Si:Acrylic ratio of 20:80 and 30:70 after heat treatment at 250 °C for 24 hours.