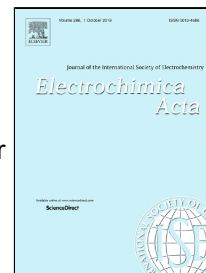


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Influences of semiconductor oxide fillers on the corrosion behavior of metals under coatings

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1 **Influences of semiconductor oxide fillers on the corrosion**
2 **behavior of metals under coatings**

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10 **Abstract:** Semiconductor oxides are widely used as coating fillers, while few studies
11 have focused on the interactions between semiconductor fillers and metal substrates. In
12 this paper, common semiconductor fillers including TiO_2 , Fe_2O_3 and Cu_2O were
13 prepared and incorporated into polyvinyl butyral coatings. Localized EIS, EIS, SEM
14 and electrochemical noise analysis were applied to study the corrosion behavior of
15 semiconductor/metal contacts at coating defects. Results revealed that TiO_2 and Fe_2O_3
16 accelerated the corrosion of metals, while Cu_2O showed no promising effect.
17 Meanwhile, a micro-galvanic corrosion mechanism based on work function difference
18 and oxygen reduction reaction activity was proposed to explain the corrosion-
19 promotion phenomenon.

20
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22 **Keywords:** Organic coatings; Semiconductor oxide; Localized EIS; Work function

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