

36 – 55 Electrophoretic deposition assisted by soluble anode

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The rate of cathodic electrophoretic deposition (EPD) of silicon monoxide particles was accelerated by using a soluble anode such as stainless steel or zinc in an acetone bath containing iodine. In contrast, the use of an inert anode such as Pt inhibited deposition. In the former cases, anodic dissolution or corrosion of the metal plate occurred due to the presence of iodide ions in the bath. The metal ions produced adsorbed onto surface hydroxyl groups of oxide particles together with protons. As a result, a positive suspension ζ -potential was achieved. Deposition using the Zn anode was about 10 times larger than that for the stainless steel anode, attributable to the difference in the solubility of the substrate. The Zn anode is likely to be more soluble than the stainless steel anode because stainless steel is covered with more protective passive film. The electrophoretic deposition mechanisms are discussed briefly, and the utility of a soluble anode in EPD is demonstrated.

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