



Electrodeposition of Aluminum

Due to the limited electrochemical window of water, aqueous solutions cannot be used for the electrodeposition of less noble metals like aluminum. Nevertheless, there are many interesting applications for aluminum layers as corrosions inhibitors or design elements. Brilliant aluminum layers can i. e. replace chromium layers. Therefore, the electrodeposition of aluminum from water-free electrolytes is of high technical interest.

Ionic liquids are low melting salts, which are liquid below 100 °C. They are incombustible and possess a high thermal stability, a low vapour pressure as well as good ionic conductivities. Their wide electrochemical windows (up to 6 V) makes them suitable media for the electrodeposition of metals like aluminum. Therefore, ionic liquids based electrolytes are an attractive alternative to aqueous electrolytes. Since their price is naturally above water-based electrolytes, it's important to know that ionic liquids can be recycled easily and reused.

IOLITEC developed ready-to-use electrolytes for the aluminum deposition from which you are able to deposit brilliant aluminum layers on copper (Fig. 1), steel (Fig. 2) or aluminum (Fig. 3). There are nearly no limitations on the structure of the substrate (Fig. 4-6).

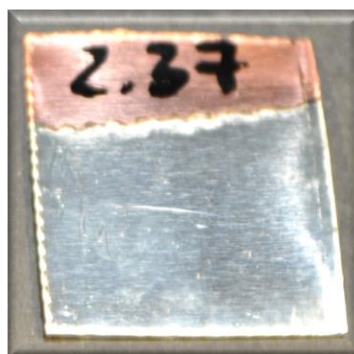


Fig. 1: Aluminium-coated copper plate

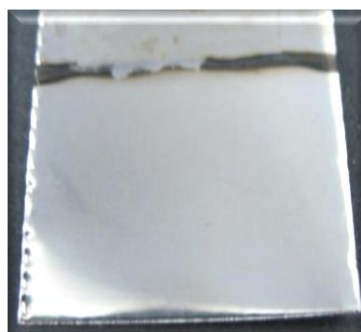


Fig. 2: Aluminium-coated steel plate



Fig. 3: Aluminium-coated aluminum plate with zinc as intermediate layer



Fig. 4: Aluminium-coated steel wire mesh



Fig. 5: Aluminium-coated toy car

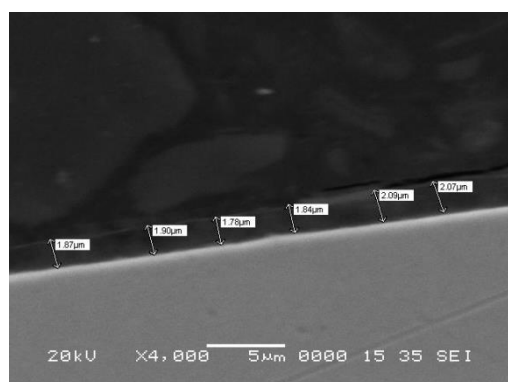


Fig. 6: SEM cross section.

The SEM micrograph of the aluminum surface on the copper plate shows a dense aluminum layer, which has after a deposition time of 10 min at room temperature a thickness of approximately 2 µm.

IOLITEC offers the following electrolytes for the aluminum deposition as catalogue products. We are also able to develop customized electrolytes.

Product Code	Compound	Quantities
EP-0001-HP	1-Ethyl-3-methylimidazolium chloride + aluminum chloride (1:1.5)	25 g to bulk
EP-0002-HP	1-Butyl-3-methylimidazolium chloride + aluminum chloride (1:1.5)	25 g to bulk
EP-0003-HP	1-Ethyl-3-methylimidazolium chloride + aluminum chloride (1:1.5) with additives for plating with brilliant aluminum layers	25 g to bulk
EP-0004-HP	1-Butyl-3-methylimidazolium chloride + aluminum chloride (1:1.5) with additives for plating with brilliant aluminum layers	25 g to bulk
EP-0005-HP	1-Ethyl-3-methylimidazolium chloride + aluminum chloride (1:1.5) with highly thermostable additives for plating with brilliant aluminum layers	25 g to bulk
EP-0006-HP	1-Butyl-3-methylimidazolium chloride + aluminum chloride (1:1.5) with highly thermostable additives for plating with brilliant aluminum layers	25 g to bulk
EP-0007-HP	1-Ethyl-3-methylimidazolium chloride + aluminum chloride (1:2)	25 g to bulk
EP-0008-HP	1-Butyl-3-methylimidazolium chloride + aluminum chloride (1:2)	25 g to bulk

