

peratures at which the composites may be used will be further raised by the use of glasses or metals as matrix materials [24,25]. Carbon fiber reinforced carbons are stable up to 3000 °C in inert or reducing atmospheres.

[24] D. H. Brown, R. A. J. Soubell, K. A. D. Lombe, and N. J. Macmillan, DOS 1925009 (1968), U.K.A.E.A.

[25] A. A. Baker and R. J. Beebe, Brit. Pat. 1177301 (1968) Rolls Royce.

However, their production is still in the experimental stage.

The further development of these new fiber-reinforced high-temperature materials will open up wide fields of application for carbon fibers.

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## Electroplating of Plastics in Theory and Practice

By Kurt Heymann, Wolfgang Riedel, and Günter Woldt (\*)

*Electroplated plastics combine many advantages of plastics and of metals; they have the low weight and ease of shaping of plastics, together with the luster, hardness, and electrical conductivity of metals. An important part of any process for the electroplating of plastics is a pretreatment to ensure good adhesion of the metal film. Each activation in the straight-through method requires only six steps for pretreatment.*

### 1. Introduction

The rapid growth of the consumption of plastics in the last 20 years is primarily due to the ease with which they can be shaped to obtain useful objects. This was greatly appreciated by industrial users, who required versatility of types and shapes with no great increase in production costs, such as arises e.g. in the processing of metals.

For this reason the users accepted disadvantages in color matching, the attraction of dust by static electricity, and the relatively soft surface of injection molded thermoplastics.

These "made-to-measure materials" offer considerable scope for the work of the chemist. The polymers can be suited to a wide range of uses by modification of the nature of the monomers, the polymerization conditions, and pigmentation, and because of the possibility of reinforcement with glass fibers. Nevertheless, plastics have to compete with the traditional metal.

It seemed natural, therefore, to seek a good combination of plastic and metal, i.e. a genuine composite of plastic and metal.

An important factor here is undeniably the wish to give a plastic surface a metallic luster for decorative reasons, since large sections of the market like the glitter of metals. It is in fact impossible to tell by appearance whether a chromium-plated object is made of metal or plastic; the difference can be felt only by

touch. Electroplated plastic feels warm and is much lighter. Because of its lightness, it is easier to transport and handle, and this is a further argument in favor of metalized plastics.

Plastics can be shaped more easily, more cheaply, and in greater variety than metals. To obtain shiny surfaces, the mold into which the plastic is injected is polished instead of each individual article. Without knowing the market, one might think that the electroplating of plastics is a passing fashion. However, this practice has many technical advantages, apart from its decorative value.

Many plastics are damaged by ultraviolet radiation. This damage is prevented by a film of metal. The flammability of plastics is also reduced by metalization.

Use is often made in the electrical industry of chassis having complicated shapes. To produce a metal chassis of this kind, several individual parts have to be fitted together and welded. It has been found in

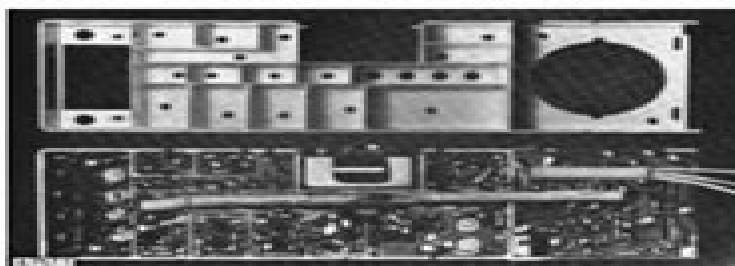


Fig. 1. Chassis of ABS plastic (Bosch Elektrowerk GmbH, Berlin).

(\*) Dr. K. Heymann, Dipl.-Phys. W. Riedel, and Dr. G. Woldt, Schering AG, Galvanotechnik, 1 Berlin 65, Postfach 59 (Germany)

# Electroplating Of Plastics Handbook Of Theory And Practice

**George J. Rudzki**



## **Electroplating Of Plastics Handbook Of Theory And Practice:**

*Electroplating of Plastics* Josef Christoph, 1977      *Plastics Products Design Handbook* Miller, 2020-11-25 This book provides information on complexities peculiarities and limitations of various molding processes and the comparative advantages and disadvantages of the possible plastic products manufacturing techniques to permit an ideal match of good design and processing      *Engineered Materials Handbook, Desk Edition* ASM International. Handbook Committee, 1995-11-01 A comprehensive reference on the properties selection processing and applications of the most widely used nonmetallic engineering materials Section 1 General Information and Data contains information applicable both to polymers and to ceramics and glasses It includes an illustrated glossary a collection of engineering tables and data and a guide to materials selection Sections 2 through 7 focus on polymeric materials plastics elastomers polymer matrix composites adhesives and sealants with the information largely updated and expanded from the first three volumes of the *Engineered Materials Handbook* Ceramics and glasses are covered in Sections 8 through 12 also with updated and expanded information Annotation copyright by Book News Inc Portland OR      *Handbook on Electroplating with Manufacture of Electrochemicals (Electroplating of Aluminium, Cadmium, Chromium, Cobalt, Copper, Gold, Iron, Lead, Nickel, Bright Nickel, Silver, Alloy, Platinum, Palladium, Rhodium, Bright Zinc, Tin, Plastics, Barrel, Electroless Plating, Metal Treatment with Formulation, Machinery, Equipment Details and Factory Layout)* Dr. H. Panda, 2024-01-01 Electroplating and Electrochemicals industries shimmering with growth and profitability potential are truly riveting Electroplating an intricate process involves the electrodeposition of a svelte metallic stratum onto diverse substrates utilizing electric currents This technique entails submerging the intended object the substrate into an electrolytic bath brimming with metal ions and through the application of an electric current achieves a homogeneous metallic veneer Conversely Electrochemicals are birthed from electrochemical reactions These intricate reactions are characterized by the transference of electrons among distinct compounds within an electrolytic milieu Through the deliberate orchestration of electron flow a plethora of chemical reactions are catalyzed culminating in the synthesis of targeted chemicals This methodology finds its application across a spectrum of industries encompassing pharmaceuticals agriculture and energy storage sectors The global electroplating market is expected to grow at a CAGR of 5.5% The growth in the market can be attributed to the increasing demand for electroplated products from various end use industries such as automotive electrical electronics aerospace defense Jewellery and machinery parts components In addition the growing awareness about corrosion protection and decorative finishes is also propelling the growth of this market This book contains in depth information about Electrochemical Processing Metal Surface Treatment Electroless Plating Electroplating Electroplating of Aluminium Cadmium Chromium Cobalt Copper Gold Iron Lead Nickel Bright Nickel Silver Alloy Platinum Palladium Rhodium Bright Zinc Tin Plastics Barrel Zinc Electroplating Brightener Metal Treatments Electrodeposition of Precious Metals Electropolishing of Stainless Steel Case Hardening

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