

This is an invention by DR. ROSHAN LAL SETH, PANAMATTATH NARAYANAN NARAYANAN NAMBOODIRI AND DR. PREM BEHARI MATHUR, all of the Central Electrochemical Research Institute, Karaikudi-2, India, all Indian citizens.

This invention relates to a process for the production of anodic coatings of black colour on copper or copper rich alloys.

When subjected to anodic treatment in alkali solutions, copper usually develops a non-uniform reddish brown coating on its surface.

We have developed a process whereby adherent, high resistant, brightly shining black coatings can be obtained on the copper as well as copper rich alloy surfaces when subjected to anodic treatment.

The invented process for the production of anodic coatings of black colour on copper or copper rich alloys consists in passing a direct current through an electrolyte using stainless steel cathode at a current density range of 15-40 amps/sq. ft. and room temperature.

An electrolyte bath containing 10-20% sodium potassium tartrate, 5-10% copper sulphate and 20-40% potassium hydroxide is used.

Adherent, high resistant, brightly shining black coatings have been obtained on the copper as well as copper rich alloy surfaces, when they are anodically polarised in a bath containing copper salt like copper sulphate, sodium potassium tartarate and an alkali like potassium hydroxide, at ordinary (room) temperature under the non stirred conditions and at appreciably low current densities. The presence of copper tartarate complex in the alkali solution rendered a radical change in the nature of the anodic coating from non uniform reddish brown to adherent black.

#### EXAMPLE

Copper and stainless steel sheets of say 4 sq. in areas are taken and placed in a 600 ml. beaker containing a mixture of copper sulphate, sodium potassium tartarate and potassium hydroxide solutions. The copper electrode is made anode and the stainless steel electrode as cathode, and the current is passed from a rectifier or an accumulator. The solution is not stirred during the experiment. Half to one amp. current is passed through the cell for about half

an hour. Afterwards the anode is taken out from the solution, washed and dried. Shining black coating is obtained on the anode.

The black coatings on metals are of particular artisan interest. Articles of decorative and ornamental nature are very often preferred black in colour. The combination of contrasting black and copper red colours has particularly a profound pleasing appeal to the eyes and hence has a high artisan value. The black anodic coatings on copper may therefore find a wide utility in handicraft industry and in the preparation of models of art. The black non-metallic anodic coatings on copper serve as a corrosion protection film. The metal may thus be protected from rusting in atmosphere. Owing to its appreciable resistance (nearly  $60 \text{ K } \Omega/\text{cm}^2$ ) this anodic coating may be useful as a dielectric material in electronic components.

We claim:

1. A process for the production of anodic coatings of black colour on copper or copper rich alloys which consists in passing a direct current through an electrolyte using stainless steel cathode at a current density range of 15-40 amps/sq. ft. and room temperature.
2. A process as claimed in Claim 1 wherein is used an electrolyte bath containing 10-20% sodium potassium tartrate, 5-10% copper sulphate and 20-40% potassium hydroxide.
3. A process for the production of black coatings on copper or copper rich alloys by anodisation, for decorative ornamental, corrosion preventive, and insulation purposes substantially as hereinbefore described.
4. Anodic coatings of black colour on copper or copper rich alloys whenever produced by anodisation according to a process substantially as hereinbefore described.

R. BHASKAR PAI

Patents Officer,

Council of Scientific & Industrial Research.

Dated this 5th day of May 1964.

Price : TWO RUPEES.