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COATING OF OBJECTS OF MAGNESIUM OR THE LIKE WITH OXIDES

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2 Claims. (Cl. 204—56)

This invention relates to the production of surface layers of oxide on objects made of magnesium or of alloys consisting principally of magnesium by anodic treatment in alkaline solution.

As compared with the process hitherto known the process according to the invention differs essentially in that the anodic treatment is carried out in aqueous solutions of alkali salts of such metal oxides as have an amphoteric character, e. g. in solutions of alkali aluminates, arsenates or zincates. The protective layers obtained from such solutions are distinguished by high resistance to corrosion, great hardness and density, and good insulating power.

Preferably the alkalinity of the solution is maintained at a pH number of about 10 to 13 and the solution is kept at an elevated temperature, e. g. at a bath temperature of 30 to 70° C.

Since on long use of the bath due to changing the objects suspended therein, and due to carbonate formation the alkalinity of the bath has a tendency to fall, the desired high alkalinity must if necessary be maintained by the addition of free alkali.

The anodic oxidation can be assisted according to the invention, by the addition of oxygen carriers, e. g. by the addition of small amounts of cerium sulphate, or of tungstates or chromates.

It has been found that the protective layers of oxide which are obtained by anodic treatment in baths of known composition can be considerably improved as regards density, hardness, insulating power and resistance to corrosion by a finishing treatment or a preliminary or intermediate treatment in baths composed according to the invention. For obtaining high insulating power the treatment in such baths as contain alkali arsenates has been found to be particularly advantageous while moreover solutions of alkali aluminates produce specially favourable results. The solutions of these salts offer also the special advantage that the metal (aluminium) is not cathodically deposited.

The conductivity of the baths is so regulated by suitable regulation of the concentration and temperature that the process is worked with currents of 1 to 3 amps. per sq. dm. By a large increase in the bath temperature e. g. to 60 to 85° C. there are obtained dark or deep black coloured protective layers.

This colouration is probably to be ascribed to certain foreign metals in the magnesium or magnesium alloys. Instead of this, the protective layers obtained according to the invention can subsequently be coloured with organic or inorganic dyestuffs, or coated with lacquers.

The protective layers can also be sealed and hardened by treatment with water glass and subsequent heating to about 150° C.

As examples of suitable bath compositions may be mentioned:

Example 1

Water	litre	1
Sodium aluminate	grams	200
Cerium sulphate	do	3

if desired acid or alkali additions are made thereto until the desired pH value is obtained. Temperature 40° C.

Example 2

Water	litre	1
Sodium arsenate	grams	200
Cerium sulphate	do	3

if desired alkali or acid is added thereto until the desired pH value is obtained. Temperature 50° C.

The process can be carried out using direct or alternating current. Whilst hitherto in the superficial oxidation of magnesium and magnesium containing alloys, alternating current had to be used, an advantage of the new process consists in that sufficiently strong protective layers can be obtained by the use of direct current under relatively low voltages e. g. 10 volts and with current densities which are about as high as those usual in the anodic oxidation of aluminium in aqueous solutions.

The protective layers obtained according to the new process produce even on profiled objects a good corrosion resistance and possess a high absorptive power for sealing agents such as water glass.

On account of the capability of the protective coating of being produced in thick layers the corrosion protection is especially good since thick layers are capable of absorbing correspondingly more sealing agent.

We claim:

1. A process for the production of protective layers of oxide on objects made of magnesium or magnesium alloys comprising making said objects the anode in a bath containing an alkali arsenate, and passing an electric current through said bath.

2. A process for the production of protective oxide layers on objects made of magnesium or magnesium alloys, comprising making said objects the anode in a bath containing an aqueous solution of an alkali salt selected from the group consisting of alkali aluminates, arsenates and zincates, adjusting and maintaining the pH value of said bath at about from 10 to 13, and passing a direct electric current through said bath, while keeping the temperature of the bath at a temperature of from 30 to 85° C.

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