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ZINC CYANIDE PLATING BATH

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This invention relates to the electrodeposition of zinc, and is particularly directed to processes wherein a bright mirror-like zinc deposit is plated from cyanide zinc baths which contain substantial amounts of a soluble resinous material prepared as hereinafter described.

An object of the invention is to provide a plating solution for the deposition of a zinc coating which is materially brighter in surface appearance than zinc coatings heretofore obtainable by commercial zinc plating processes, and which is at least the equal of such commercial process in corrosion resistance and wear resistance.

As a basic solution I use the well known zinc cyanide plating bath which, as is known to those skilled in the art, may vary within recognized composition limits in accordance with certain desired characteristics and process limitations. One such composition, for example, could be:

	G. per liter
Zinc cyanide ($Zn(CN)_2$)	60
Sodium cyanide (NaCn)	42
Sodium hydroxide (NaOH)	78

For convenience this will be hereinafter referred to as the "A" solution, and my present invention resides in the discovery of a novel product obtained by reacting four separate ingredients in aqueous solution. The product obtained as hereinafter set forth, when combined with the "A" solution (or any conventional or useful zinc cyanide plating bath) produces the exceptionally bright plated surface described above. The identity and amount of each material entering into the manufacture of the brightening agent is as follows:

	Grams
Ammonium thiocyanate	10–30
Dicyandiamide	10–30
Sodium hydroxide	4–15
Formaldehyde	40–100
Water	40–100

More specifically, the following composition of ingredients has been found to produce the desired results after a refluxing period of 1½ to 2 hours.

	Grams
Ammonium thiocyanate	24
Dicyandiamide	21
Sodium hydroxide	10
Formaldehyde	75
Water	60

The materials thus shown are placed in a closed vessel to which a reflux condenser is attached.

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Heat is applied until the mixture boils and is continued for a period of 1½ to 2 hours after which time the reaction is considered complete. The clear somewhat syrupy liquid obtained at the end of this period is ready for use as a brightener for zinc deposits from cyanide zinc plating baths. For convenience I hereinafter term this product the "B" solution.

When the "B" solution is made up it is added to the "A" solution in the proportion of about .25 gram of "B" per liter of "A" to 2.0 grams of "B" per liter of "A."

As is customary, the article to be plated constitutes the cathode, and a zinc anode is immersed in the solution, the anode being eventually consumed. The customary factors in plating processes, namely time, temperature, solution concentration, and current density have their usual effects in the plating solution herein disclosed.

The plated coating obtained by means of my novel bath composition as hereinabove disclosed, has a surface appearance having a smooth satiny-silver luster. It is wear resistant and corrosion resistant, and its brightness is substantially permanent.

What I claim is:

1. As an added component for a zinc cyanide plating bath, an aqueous solution containing the reaction product obtained by heating together in aqueous solution from 10 to 30 grams of ammonium thiocyanate, from 10 to 30 grams of dicyandiamide, from 4 to 15 grams of sodium hydroxide, and from 40 to 100 grams of formaldehyde.

2. A zinc cyanide plating bath containing from 0.25 gram to 2.0 grams of an addition component per liter of bath, said addition component containing the reaction product obtained by heating together in aqueous solution from 10 to 30 grams of ammonium thiocyanate, from 10 to 30 grams of dicyandiamide, from 4 to 15 grams of sodium hydroxide, and from 40 to 100 grams per liter of formaldehyde.

3. A plating bath as defined in claim 2, wherein the ingredients of the addition component are heated together in the following proportions, ammonium thiocyanate 24 grams, dicyandiamide 21 grams, sodium hydroxide 10 grams, formaldehyde 75 grams.

4. A plating composition as defined in claim 3, wherein the addition component is added to the zinc cyanide bath in the proportion 0.25 gram to 2.0 grams of the component to one liter of the bath.

5. A method for electrodepositing zinc from

cyanide zinc plating baths in the form of bright-mirror-like deposits, said method comprising electrodepositing the zinc from a cyanide zinc plating bath containing, per liter of bath, from 0.25 to 2.0 grams of the reaction product obtained by reacting together in aqueous solution from 10 to 30 grams of ammonium thiocyanate, from 10 to 30 grams of dicyandiamide, from 4 to 15 grams of sodium hydroxide and from 40 to 100 grams of formaldehyde.

6. An addition component for a zinc cyanide plating bath comprising the reaction product obtained by heating together in aqueous solution ammonium thiocyanate, dicyandiamide, sodium hydroxide and formaldehyde in the following proportions, from 10 to 30 grams of ammonium thiocyanate, from 10 to 30 grams of dicyandiamide, from 4 to 15 grams of sodium hydroxide and from 40 to 100 grams of formaldehyde.

7. An addition component for a zinc cyanide plating bath comprising the reaction product obtained by heating together in aqueous solution ammonium thiocyanate, dicyandiamide, sodium hydroxide and formaldehyde in the following proportions, from 10 to 30 grams of ammonium thiocyanate, from 10 to 30 grams of dicyandiamide, from 4 to 15 grams of sodium hydroxide, from 40 to 100 grams of formaldehyde, and 40 to 100 grams of water.

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