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Studies on Thermogalvanic Corrosion of Cu-Zn Alloys

Hiroshi HIRASHIMA (平島 碩)

Under the consideration that basic study on the thermogalvanic feature of alloy is important from the standpoint of corrosion prevention, copper-zinc alloys were selected, and their thermogalvanic characteristics were studied.

Two kinds of samples, both of which were composed of α solid solution, were prepared, and their spontaneous electrode potentials, spontaneous corrosion rates and polarization curves in several solution at 25°C~85°C were measured.

In addition, thermogalvanic cells were constructed and thermogalvanic current and rates of thermogalvanic corrosion were measured. After these measurements, it was found that the cell having chloride acidic solution (pH 2~4), the thermogalvanic emf. was fairly large and the hotter electrode was anode.

In steady state of spontaneous corrosion, chemical reactions were considered to be dissolution of alloy as CuCl_2^- and ZnCl^+ at anode part and reduction of dissolved oxygen at cathode part. Decuprification was also observable at Cu-rich sample. Above chemical reactions seemed to be scarcely influenced by the thermogalvanic current, although the corrosion of hotter electrode (anode) was evidently accelerated. The amount of corrosion due to thermogalvanic action was estimated to be nearly the same order of that due to spontaneous corrosion.

Studies on the Electrode of Ceramic Condenser

Motoko HIROOKA (広岡 素子)

In ordinary ceramic condenser, silver electrode is used widely. The author tried to use more cheap metal, copper, as electrode. As copper is not so noble as silver, copper oxide is not suitable for baking raw material. Therefore the first stage the author, at first, prepared fine powder of copper by the reduction of copper glyceride with aluminium.

This powder of copper was mixed with linseed oil, and the paste thus prepared was painted on the surface of ceramics and baked at high temperature. In order to avoid the oxidation of copper, baking was carried out in the atmosphere of ethanol vapor, and the temperature was kept at 500°C~800°C.

In this manual, adherent copper deposit was obtained on the surface easily and soldering was possible on it. But in the case of Ba, La or Sr-titanate system, electrical resistivity of the ceramic markedly decreased because of the reduction