

GSB NEWS
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Dear members of the GSB,

today it is time for a guest contribution.

Markus Schöll (Managing Director of NABU-Oberflächentechnik GmbH) provides a report on the topic of bath poisons and gives recommendations on how to counteract copper as a bath poison in particular.

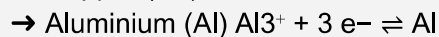
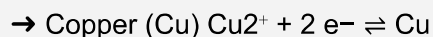
As always, we wish you a pleasant read.

Your GSB Team



Avoidance of Bath Poisons - Markus Schöll

The intrusion of foreign ions repeatedly leads to problems in the corrosion protection of aluminum components. These foreign ions are also known as "bathpoison." Unlike, for example, the formation of phosphate layers during steel pretreatment, in which the aluminum cation (Al^{3+}) interferes with the formation of the layer, contact with aluminum sometimes results in severe corrosion damage. As Dr. Blecher has already explained very clearly in a recent memo, one example of this is copper, which can become a problem in the mounting of components with copper hooks, since copper is higher than aluminum in the electrochemical series.



Copper ions in the bath that reach the aluminum surface also lead to an exchange of electrons. According to the electrochemical series, the redox potential of the pair Cu/Cu^{2+} is +0.35V, while that of Al/Al^{3+} is -1.66V. Thus, the aluminum is oxidized and emits electrons, while the copper is reduced and can deposit itself on the surface. The resulting damage to the component depends on the material thickness and exposure time.

How much copper is dissolved into the bath depends on the pH value. Thus, the more acidic the environment, the more copper is dissolved. At a pH value of 3, for example, more than ten times as much copper is dissolved than is dissolved at a pH value of 7. This pattern is further influenced by treatment time and treatment temperature.

This means that, for example, in an acidic pickling degreasing with a very low pH value, a lot of copper dissolves into the bath and concentrates in the bath over time. Thus, as the copper content in the bath increases, an ever greater number of corrosion germs will reach the aluminum surface.

But also zinc with a potential of -0.76V and iron with a potential of -0.44V can therefore be

called "bath poisons".

Therefore, topics such as attachment equipment, process parameterization, ratio of substrates, etc. are crucial factors for process control and design in order to produce high and consistent quality.

Specific measures to avoid bath poisons are for example:

- The use of stainless steel or coated material for mounting
- Continuous bath maintenance & regular plant cleaning
- Substrate separation to the greatest extent possible
- Factoring in the design of the pretreatment process

Technology

Katrin Schleicher is looking forward to your suggestions for topics and questions around the field of **technology**:

katrin.schleicher@gsb-international.de

Editorial Office / Business & Marketing

For general questions or suggestions regarding GSB NEWS as well as topic requests on the subjects **business and marketing**, Philipp Mader is your contact person:

philipp.mader@gsb-international.de



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