Acetates

Author: *L. Hasenberg* / Editor: *R. Bender*

Copper and copper alloys

Copper and its alloys are relatively resistant to aqueous aluminium acetate solutions. For example, copper, CuAl-, CuSi- and CuSn-alloys are resistant to basic aluminium acetate [1]. Corrosion rates in aqueous solutions of low concentration are below 0.5 mm/a (19.7 mpy) at 295 K (22 °C) [2–4].

CuAl- and CuSi-alloys are resistant to ammonium acetate solutions [1]. Highly concentrated and moist solid ammonium acetate attacks copper and its alloys (above 1.25 mm/a (49.2 mpy)) [2–4].

Copper and its alloys lose up to 1.25 mm/a (49.2 mpy) in aqueous 10 % lead acetate solutions even at 295 K (22 °C); this value is exceeded at higher temperatures (373 K (100 °C)) [3, 4].

Aqueous potassium acetate solutions even at their boiling temperatures do not attack copper and its alloys. Drying pansdrying pans of copper, in which completely anhydrous potassium acetate used for rectifying alcohols is produced at 613 K (340 °C), show only slight corrosion attack [1]. The corrosion rates of 99.9 % copper and of alloys having copper contents above 85 % are below 0.5 mm/a (19.7 mpy) in solutions of all concentrations at temperatures up to the respective boiling point; higher rates (up to 1.25 mm/a (49.2 mpy)) are found in the melt above 590 K (317 °C) [2–4].

Corrosion rates for copper and its alloys in calcium acetate solutions are around 0.05 mm/a (1.97 mpy) at virtually all concentrations [2–4].

Neutral and alkaline solutions or suspensions of copper acetates virtually do not attack copper, bronzes and copper-nickel alloys in the absence of air, whereas acidic solutions corrode these materials in the presence of air or other oxidizing agents.

Paris Green, $Cu(C_2H_3O_2)_2 \cdot 3Cu(AlO_2)_2$, can be precipitated in copper kettles. Reaction vessels made of copper or aluminium bronze can be used in organic halogenations using cuprous acetate as catalyst [1].

Brass having a high zinc content is unsuitable as a material for handling copper acetates [1]. The corrosion rates exceed 1.25 mm/a (49.2 mpy) [1–4,]. In the case of alloys containing at least 85 % copper and of pure copper, corrosion rates in 10 % and 90 % copper acetate solutions are about 0.05 mm/a (1.97 mpy) and do not exceed 0.5 mm/a (19.7 mpy) [2–4].

Pure copper is not susceptible to stress corrosion cracking in copper acetate solutions [5].

Copper and its alloys having Cu contents above 85 % are very resistant to sodium acetate solutions (corrosion rates below 0.05 mm/a (1.97 mpy)) in solutions of any concentration up to their boiling points; at temperatures above 422 K (149 °C) (in the salt melt), however, the rates are between 0.5 and 1.25 mm/a (19.7 and 49.2 mpy)

[1, 4, 6, 7]. The CuNi-alloys, however, are highly resistant even at 613 K (340 °C) (less than 0.05 mm/a (1.97 mpy)) [4, 7].

Altogether, copper and its alloys are relatively resistant to sodium acetate solutions, with rates of corrosion usually around 0.05 mm/a (1.97 mpy).

Containers, piping and drying pans made of copper and its alloys, or valves, pumps and fittings made of bronze and brass, are used for handling sodium acetate solutions [1]. Sodium acetate solutions having a pH value of 8 can cause stress corrosion cracking in 70/30 brass [8].