

# Electroreduction of Ag(I) in non-aqueous ternary choline chloride containing solvent with the usage of AgCl

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Silver and its alloys such as Ag-Cu, Sn-Ag are widely used in printed circuit boards production [1]. Non-aqueous solution for silver electrodeposition with three-component solvent containing choline chloride (ChCl), ethylene glycol (EG), urea (U) and AgCl as silver source was investigated. It was needed for the development of stable, easily corrected for multiple electrolyte using. AgCl was used owing to its rather high solubility in non-aqueous ChCl containing solution [1]. AgCl concentration was varied in the limits 0.025–0.100 mol dm<sup>-3</sup>.

Solution is stable for a year and more and can be corrected many times. Current efficiency of Ag(I) reduction depends on silver salt concentration and can be varied in the limits 5.4–43.4%. The maximum rate of silver coatings growth is close to 1.8 μm h<sup>-1</sup>. It is achieved under the conditions: C(Ag(I)) = 0.100 mol dm<sup>-3</sup>, T = 20 ± 2°C, i = 1 mA cm<sup>-2</sup>. It was found that the usage of the proposed electrolyte allows to deposit crystalline silver coating with highly developed and porous surface in case of C(AgCl) 0.025–0.050 mol dm<sup>-3</sup> and more tightly packed in case of the C(AgCl) = 0.100 mol dm<sup>-3</sup> (Fig).

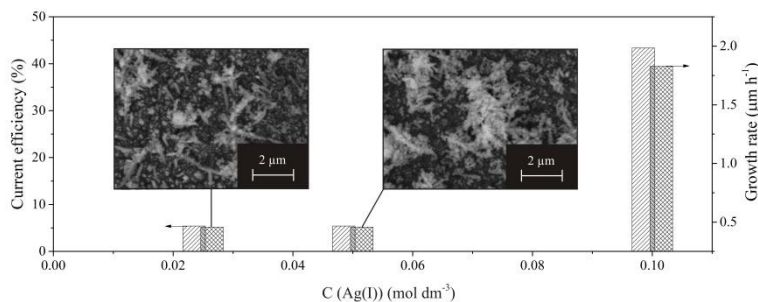


Fig. The dependence of current efficiency (left), coating growth rate (right) and surface morphology (SEM photos) of silver coatings on Ag(I) concentration in electrolyte

## References

- [1] A.P. Abbott et al. Phys. Chem. Chem. Phys. (2012) 14: 2443.
- [2] M. Salman Int. J. Life Sci. Pharma Res.(2012) 2: L-143.