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The solubility of components of the photosensitive compositions based on cupric acetate and sodium salts of anthracenesulfonic

© **Ludmila A. Brusnitsina**,[1,2]*+ **Tatiana A. Alekseeva**,[1] and **Elena I. Stepanovskih**[1]
[1] *Physical Chemistry and Chemistry of Colloids Academic Department. Ural Federal University Named after the First President of Russia B.N. Yeltsin. Mira St., 19. Yekaterinburg, 620002. Russia.*
E-mail: brusnitsyna.l@yandex.ru
[2] *Ural Institute of the State Fire Service of the Ministry of Emergency Measures of Russia. Mira St., 22. Yekaterinburg, 620062. Russia.*

*Supervising author; +Corresponding author
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Abstract

In photoaddition technology of printed it is possible to allocate two main stages: 1) formation of circuit pattern of the printed circuit Board; 2) building metallic coatings in solutions of chemical copper plating. The quality of the copper coating is largely determined by the structure of the dry layer of the photoactivator.

Photosensitive composition containing fotopromotor-the copper acetate optical sensitizer – the sodium salt of Anthraquinone-2-sulfonic acid or salt dinatrievuju Anthraquinone-2,6-sulfonic acid, secondary Restorer – the sorbitol, Pentaerythritol, ethylene glycol, citric acid, used for SDS surface dielectric materials in additive fabrication technology printed circuit boards.

Structure of photosensitive dry layer is determined by the sequence of allocation solution components of photosensitive composition in terms of the equilibrium crystallization, which is determined by the solubility of components in the liquid phase when different temperatures.

In order to clarify the behavior of components of photosensitive compositions in the drying process the solubility in water main components was studied in the temperature range 293-353 K: copper acetate, sodium antrahinonsulfokislot, pentaerythritol and sorbitol. The values of the molar enthalpy of dissolution in water were determined: for copper acetate it is 3.02 kJ/mol, sodium salt anthraquinone-2-sulfonic acid-32.84 kJ/mol, disodium salt anthraquinone-2,6-sulfonic acid – 23.76 kJ/mol, sorbitol – 7.05 kJ/mol, pentaerythritol – 13.3 kJ/mol, citric acid – 8.38 kJ/mol.

The solubility of the disodium salt antrahinon-2,6-sulfonic acid is studied in a binary solvent containing water and ethylene glycol in the temperature range 293-353 K. The values of the molar enthalpy of dissolution were determined in solvents of different composition.

Endothermic dissolution decreases with increasing content of ethylene glycol. This indicates a lower solvency of the mixed solvent. Indeed, ethylene glycol is a less polar solvent than water and forms hydrogen bonds worse. Therefore, the introduction of ethylene glycol in the composition of the mixed solvent leads to less solvation of the molecule of anraquinone-2,6-sulfonic acid disodium salt. On the other hand, it is necessary to take into account changes in the structure of the mixed solvent water – ethylene glycol with an increase in the content of ethylene glycol.

Introduction to the composition of the solvent of ethylene glycol leads to a decrease in solubility of the disodium salt antrahinon-2,6-sulfonic acid. The higher the dissolution temperature, the effect of ethylene glycol affects more. Based on this, we can conclude that the presence of ethylene glycol in the composition of the photo composition is undesirable.

Sodium salts of anthraquinone sulfonic acids have a lower solubility in water compared with other components of photosensitive composition. The solubility of copper acetate and pentaerythritol is slightly higher, and the solubility of sorbitol and citric acid is an order of magnitude higher than the solubility in water of the other components of the photo-composition.

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