

## COMPARATIVE METHODS FOR CHARACTERIZATION OF Au-MERCAPTOTRIAZOLE CRYSTALS

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A completely new electrolyte for gold electroplating based on the gold complex with mercaptotriazole was synthesized in a wide pH range from acid to alkaline (pH = 2–12). The synthesized solutions of the gold complex with mercaptotriazole were evaporated to dryness at room temperature to obtain and characterize the Au-MT in crystalline form. Comparative characterization of the obtained crystals was performed using optical microscopy, IC/Raman spectroscopy, mass spectrometry, X-ray diffraction, DSC/TG, and SEM-EDS analysis. Optical microscopy of these crystals showed that the crystals obtained at different pH values differ in color, size, and homogeneity. The most homogeneous and smallest crystals are obtained from electrolytes at pH = 9. The most important finding of IC/Raman spectroscopy analysis is that the Raman spectroscopy has provided definitive confirmation of the bond established between the metal ion and sulfur atom. The mass spectrometry method indicated the presence of large mass molecules that can correspond to combinations of Au-2MT, Au-2MT-Gly, and even the combination of Au-2MT-2Gly cannot be completely excluded in the final formulation of the structure of the resulting compound. The X-ray diffractogram Au-MT crystals obtained from electrolytes at pH = 9 does not show a match with the cards of any known gold compound, which confirmed the assumptions that a new compound was synthesized. DSC/TG analysis results show that the loss of mass during heating takes place in two stages and that the most significant loss of mass originates from the loss of sulfur. Scanning electron microscopy (SEM) with energy-dispersive spectrometry (EDS) of crystals of gold complexes with mercaptotriazole showed that crystals obtained at different pH values differ from each other in shape, size, and homogeneity. The most homogeneous and, at the same time, the smallest crystals were obtained from electrolytes at pH = 9.

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