

Correlation Between Inductively Couple Plasma and Photothermal Radiometry to Determine the Ag Concentration in Silver Alloy

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The development of non destructive and non contact techniques for evaluation of metallic materials are actually invaluable to metals characterization. PTR amplitude and phase images of silver alloys were used to study the silver distribution in alloys rich in silver and copper for Ag concentration between 37 and 92 %. The silver concentration was determined using inductively coupled plasma; XRD analysis was used to characterize the crystalline structures in the silver alloys. It was found that for Ag concentration lower than 50 %, the PRT signals are governed by the thermal and optical properties of copper and vice verse. It was possible to establish a good correlation between PTR amplitude and phase signal with the Ag concentration. This means that after calibration it is possible to determine the Ag concentration using non destructive evaluation. The changes of the XRD- FWHM for each peak as well as the peaks shift allow for evaluation of the crystalline quality of silver alloys after the coinage process.