

# ANALYTICAL DETERMINATION OF SMALL CONCENTRATIONS OF Zn AND Cd IN THE Pb-Cd-Zn ALLOY BY ALSV TECHNIQUE

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The anodic linear sweep voltammetry technique (ALSV) can be employed as an analytical tool for determining small amounts of an alloying element in the bulk of the other component in binary and ternary alloy. In some systems<sup>1,2</sup> as in the ones investigated in this work, ALSV can detect only that portion of the less noble component which crystallised in a separate phase, while that in the solid solution dissolves only with the dissolution of the bulk metal. In this communication an attempt was made to determine small concentrations of Zn and Cd in metallurgically prepared ternary alloys Pb-Cd-Zn on ALSV technique. It is shown that the ALSV technique is very sensitive to the very small amounts of Zn and Cd in alloy samples and that well defined ALSV peaks of Zn and dissolution can be detected on the voltammograms in all cases.

The influence of the type and the pH of electrolyte and the sweep rate on the results of ALSV technique of Zn and Cd dissolution from above mentioned Pb-Cd-Zn alloys have been investigated.

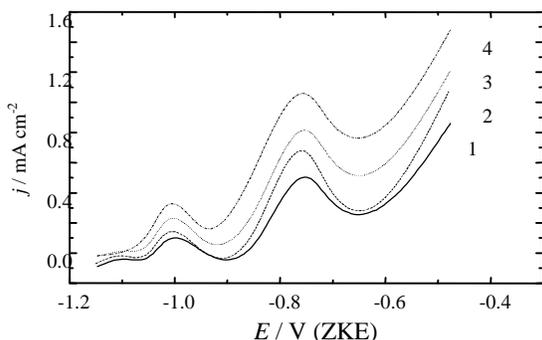


Fig.1. Typical voltammograms of Pb-Cd-Zn alloy dissolution.

A well defined linear dependences between the charge obtained by the integration of surface under the ALSV peaks of Zn and Cd dissolution ( $Q_{Zn}$  and  $Q_{Cd}$ ) and the content of Zn and Cd in the alloys ( $w$ ) were obtained. These dependences are used as the calibration diagrams for the determination of the content of the Zn and Cd in the investigated alloy. In the case of Pb-Cd-Zn alloys it was found that the lower limit of Zn which can be detected by the ALSV technique is 0.25 wt.% and Cd which can be detected by the ALSV technique is 0.60 wt.%. It is shown that

the ALSV technique is non-destructive, since only 15-20 atomic layers of the less noble metals (Zn and Cd) are dissolved during the ALSV technique application. Under many conditions the relative standard deviation (RSD) was <9%.

## References:

- (1) R.M. Zejnilovi, N.Z. Blagojevi, V.D. Jovi and A.R. Despi, *Analytica Chimica Acta*, 327 (1996) 107-116.
- (2) N.Z. Blagojevi, R.M. Zejnilovi, A.R. Despi and @.Ble-i, *J. Serb. Chem. Soc.*, 64 (11) 707-720 (1999).