CONFOCAL MICRO-XRF ANALYSIS FOR MONITORING CHEMICAL REACTIONS

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Confocal micro-XRF analysis enables a depth-selective elemental analysis of solid samples. There are many reported applications for non-destructive analysis of paintings, industrial materials, and forensic sample [1]. However, we think that one of the important advantages of this technique is elemental mapping in solutions [2,3].

A low-carbon steel sheet was placed in NaCl solution. Fe Ka intensity was monitored with corrosion time by repeating a line analysis in the solution at a fixed lateral position. This experiment gave an Fe distribution image in the solution as a function of the time. The confocal micro XRF instrument was also applied for monitoring of displacement plating process. Time dependent profiles of Fe and Cu were acquired by repeated line scan in the solution above the steel sheet.

Micro-XRF image in the case of low concentration is not clear due to high background noise in the XRF spectra. Therefore, a principal component analysis (PCA) was applied. A large number of XRF spectra were analyzed by PCA. The feasibility of this technique for XRF elemental mapping will also be discussed.

References