



STUDY OF THE SPATIAL RESOLUTION IN EPMA FOR THE CHARACTERIZATION OF NI-CR-FE ALLOYS

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ABSTRACT

The spatial resolution in electron probe microanalysis (EPMA) is studied, with the aim of developing a methodology capable of characterizing grain boundaries and precipitates in Ni-Cr-Fe alloys in a submicron scale.

Monte Carlo simulations are used to analyze the spatial distribution of K- and L-shell ionizations for Ni, Cr and Fe, when pure metals and alloys are irradiated with different beam energies. From this survey, a dependence of the spatial resolution on incident energy is determined.

Complementarily, the accuracy of the chemical quantification of the alloys by EPMA is analyzed, in experiments performed with the same incident energies than the simulations. An energy dispersive system is used for the analysis through K lines, whereas a wavelength dispersive one is used in order to perform the analysis by means of L lines.

Finally, the optimal experimental conditions are found for an accurate quantification of these alloys with the best spatial resolution possible.

Keywords: EPMA; Spatial resolution; Nickel-base alloys