The Influence Of EIE Addition On Analyte Spectral Line Emission In DC Argon Arc Plasma - Radial Position Dependence

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The influence of easily ionized elements (EIE) on spectral line emission intensities in dc argon arc is very pronounced and represents one of the major disadvantages in the analytical use of this device [1]. This influence may be overcome by the addition of appropriate amount of spectrochemical buffer (usually 0.5% KCl in nebulized solution). Beside the negative there is also a positive side of this effect: analyte emission enhancement brought by the EIE addition improves the sensitivity of determination for large number of elements [2]. The aim of this work was to study the radial distribution of emission intensity enhancement due to EIE addition, for several selected elements with different ionization energies. It was shown that the addition of 0.5% KCl increases the emission intensity for atomic and ionic lines of elements with ionization potential lower than 8 eV (large number of elements is in this group, i.e. most metal elements). The observed enhancement increases from the arc periphery toward the arc axis where it reaches a maximum, Fig. 1. Depending on the studied element, the enhancement goes from few % on the far periphery to a few tenths of time on the arc axis. The obtained results may be explained by the influence of EIE on radial electric field which prevents the partially ionized analyte to enter the hottest plasma zones [1].

![Figure 1. Radial distribution of the intensity enhancement for SrI 460.733 nm line, in presence of 0.5% KCl in nebulized solution.](image)

References