

due to convection, has been evaluated from experimental results, too. The calculations with general transport velocities, found experimentally from expansion of excited cloud of evaporated substance, gave the values of velocity components due to electric field and diffusion. The observed substance's injection has been pulsed, and at different places in the arc. Relative vertical position of anode and cathode were changed, too. The comparison of results with those of other authors is given in the table.

DATA FROM:	$v_{\text{conv.}}$ (m/s)	$v_{\text{dif.}}$ (m/s)		$v_{\text{el.}}$ (m/s)		$\tau$ (ms)	
		Li	Na	Li	La	Li	Na
our results:	1.22—1.98	3.5(3)	3.4	2.2 (2,35)	1.5	4.6 (—) 7.34 (+)	2.02 (—) 3.52 (+)
Goldfarb, Vainboim:	$1.4 \pm 0.2$				$2.6 \pm 0.5$		
Goldfarb, Ilina:	2				50		
Suits:	1.2—0						
V. Stekelen- burg:	1.5—2						
Hagenah:	2.05—0						
Bril:	1.89—4.19						
Goldfarb, Ilina:	0.7					<sup>2</sup> (1.4—2.7)	<sup>3</sup> (2.2—3.9)
Raihbaum, Malyh:						1 (1.4)	
Malyh, Serd:						1.2	1.7

### 3.12 The influence of lithium on the change of spectral line intensity in the unhomogenous magnetic field

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#### *Abstract*

The influence of lithium, i. e.  $\text{Li}_2\text{CO}_3$ , on spectral line amplification in the external inhomogeneous magnetic field has been investigated.

Three types of the ratio of the spectral line intensities have been considered

$$A_1 = I_1/I_0, \quad A_2 = L_{L1}/I_0, \quad A_3 = I_1/I_{L1}.$$

$I_1$  — Intensity of the spectral line with the anode electrode (10 mm in the diameter) in the magnetic field, with  $\text{Li}_2\text{CO}_3$  added and with the background correction.

$I_0$  — Intensity of the spectral line with the standard electrode 6 mm in diameter, without the magnetic field and without  $\text{Li}_2\text{CO}_3$ , with the background correction.

$I$  — Intensity of the spectral line with the standard electrode 6 mm in diameter, without the magnetic field, with  $\text{Li}_2\text{CO}_3$  and with the background correction.]

We examined the connection of these three defined amplifications as a function of the  $\text{Li}_2\text{CO}_3$  added in the probe.

The other possibility for the amplification of the spectral lines of the elements in traces in the plasma consists in the application of the external magnetic fields. It has been demonstrated<sup>1)</sup> that the application of the external magnetic field in the analysis of the  $\text{ZnO}_2$  gives better results in the spectrochemical detection than the addition of  $\text{Ga}_2\text{O}_3$ .

The increase of the amplification of the spectral line intensities as a function of the concentration of lithium shows that the small effects caused by lithium are considerably amplified in the magnetic field. This may be connected with increase of the residence time of the particle in the plasma, and with the influence of the increased electron concentration of the equilibrium of the ionization processes of the atoms of elements in the plasma.

With higher concentration of the  $\text{Li}_2\text{CO}_3$  the factor of amplification of the spectral line intensity in the magnetic field decreases. The decrease of the spectral line intensities in the presence of the magnetic field and larger quantities of the elements with low ionization potential may be explained by the fact that, although the intensity of the arc current are the same, the expansion of plasma no longer occurs.

## Reference

- 1) V. Vukanović and V. Georgijević, Proc. XIV Col. Spec. Internationale, Debrecen (1967) p. 525

### 3.13 Spectrochemical determination of traces in the d.c. arc plasma as a function of arc current

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#### *Abstract:*

Recently the influence of the inhomogenous magnetic field on the amplification of the spectral line intensities in the d. c. arc plasma has been investigated <sup>1, 2)</sup>.

The amplification of the intensity  $I/I_0$  can be defined as a ratio of the intensity of the spectral lines measured in the plasma with the magnetic field and without magnetic field, both with background corrections.

This paper shows the investigations of optimal conditions of the amplification of the spectral line as a function of the arc current.

The ratio  $I/I_0$  shows a very selective dependence on the arc current having the maximum at 12 A.

To explain this dependence following measurements were realised:

a) By the photographic method we obtained the projection area of the arc burning with different arc currents. The maximum was at the value of 12 A.