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Diffusion- and velocity-driven spatial separation of analytes from single droplets entering an ICP off-axis

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1. Dependence of temporal shifts and signal widths on the analyte concentration

Droplets of multi-element solutions of different concentrations were measured. The solutions were exchanged without adjusting operating parameters of the dispenser to keep the droplet size and ejection speed constant. After the removal for solution exchange, the dispenser head was inserted into the gas inlet at the same position to maintain the droplet trajectory. Figure 1 shows FWHM and temporal shifts of the $^{209}Bi^+$ signal from the signal of $^{89}Y^+$ measured at different concentrations. Despite significant increase of signal intensities (from 700 ions/droplet to 8000 ions/droplet for $^{209}Bi^+$ at concentrations of 1 mg/kg and 10 mg/kg, respectively) temporal positions of maxima remained constant within the uncertainty of the measurement (1 SD). A slight increase of the signal width with concentration was observed.

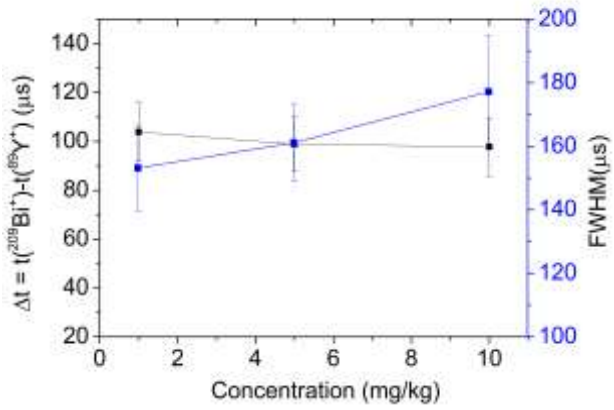

Figure 1. Temporal shifts of $^{209}Bi^+$ signal from the $^{89}Y^+$ signal and signal widths of $^{209}Bi^+$ measured at different concentrations of the multi-element solution. The error bars represent 1 SD of 500 measurements of individual droplets.

2. Boiling temperatures of oxides

Chemical formula	Boiling temperature (K)	Literature source
Cu_2O	2073[d]	http://www.hbcpnetbase.com/
ZnO	2623	Arch. Sci. Phys. Nat., 1919 , vol. 1, p. 48 - 48
Y_2O_3	4573[s]	Troshkina, O. B. Spektrosk. At. Mol., 1969 , p. 17 - 22
CdO	1832	http://www.hbcpnetbase.com/
In_2O_3	1123	Zeitschrift fuer Anorganische und Allgemeine Chemie, 1999, vol. 625, p. 1890 - 1896
BaO	-	-
La_2O_3	3893	http://www.hbcpnetbase.com/
Ce_2O_3	4003	http://www.wolframalpha.com/
Ho_2O_3	4173	http://www.hbcpnetbase.com/

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Er_2O_3	4193	http://www.hbcpnetbase.com/
HfO_2	5673	Gmelin Handbook: Hf: SVol., 6, page 20 - 22
PbO	1743	Z. Erzbergbau Metallhuettenwes., 1957 , vol. 10, p. 64 - 71
Bi_2O_3	2163	http://www.hbcpnetbase.com/
ThO_2	4673	http://www.hbcpnetbase.com/

[d] Decomposition temperature, [s] sublimation temperature