

Electronic Supplementary Information for JAAS publication

Multielement trace analysis of pure graphite powders using optical emission spectrometry coupled to a magnetically stabilized DC arc supplied with halogenating gases as chemical modifiers – a rapid and robust methodology

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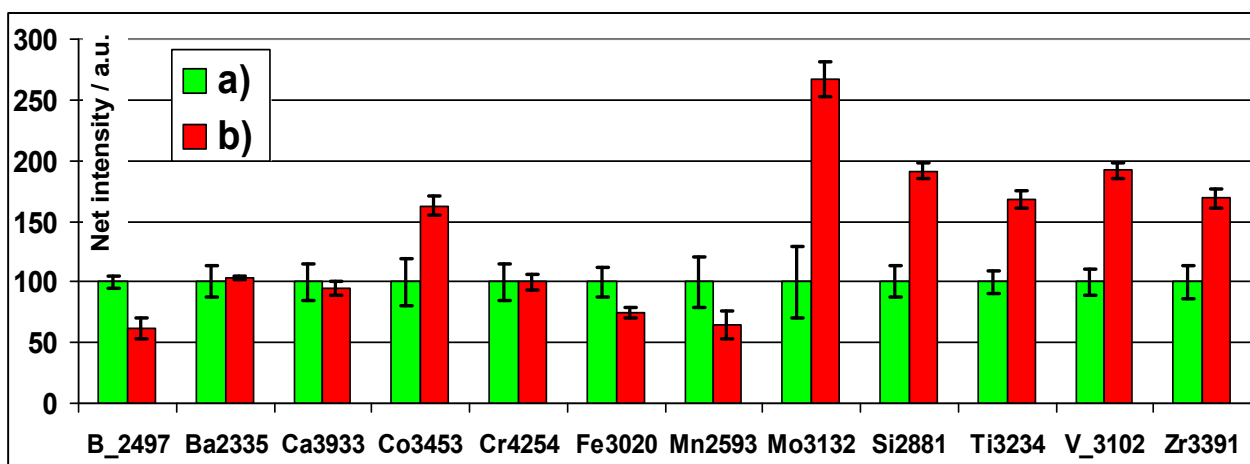


Figure S1 Influence of inserted graphite cylinder used as modifier gas guide, on the net intensities of 12 analytes. Normalized net intensities I_n , measured without (a) and with (b) guide cylinder GC of Fig. 2d. Conditions: Time program 2 of Table 2, measurement time 25 s. Uncertainty bars: SD values of means of 3 measurements

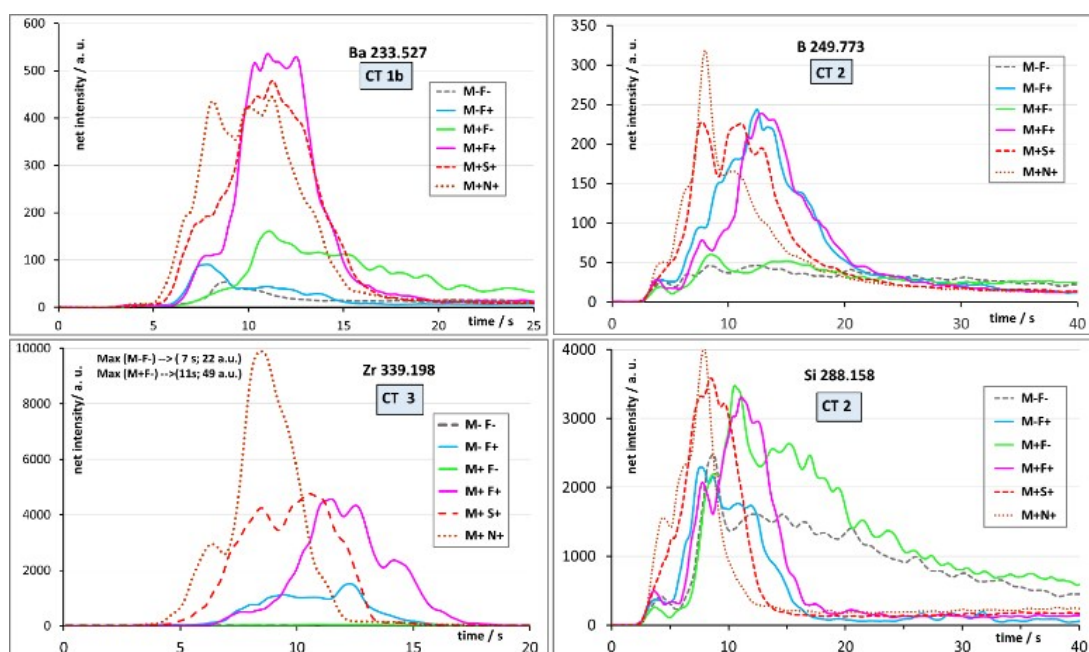


Figure S2: Time dependent net intensities of spectral lines of B, Ba, Si and Zr. Graphite material: NBG-18. All explanations as used in Table 4. CT = carbide type. The curves are means of 3 independent measurements which were smoothed after averaging (moving average smoothing-interval: 1 s, 10 points)

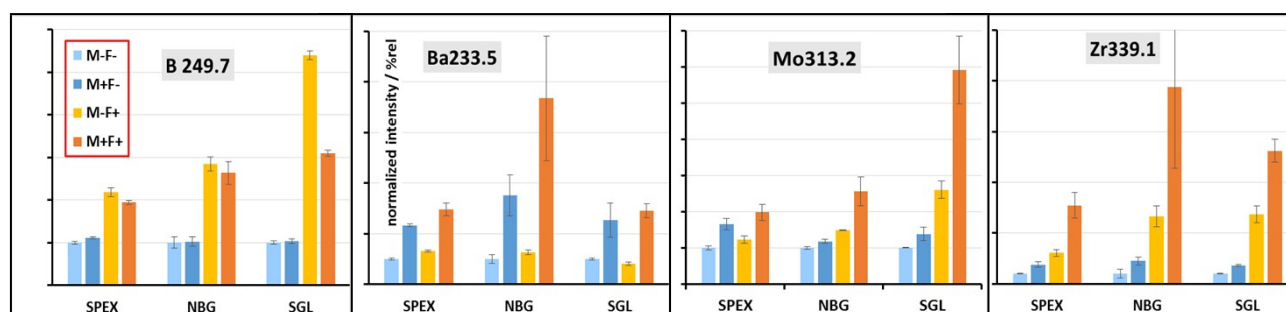


Figure S3: Patterns of influence of magnetic field ("M+") and/or modifier gas CCl_2F_2 ("F+") on the net line intensities of four analytes normalized to the intensities measured without magnetic field ("M-") and without modifier gas ("F-"). "Spex" = oxide-doped calibration sample (analyte mass fractions 5 mg/kg), NBG = CRM candidate material NBG-18, "SGL" = graphite powder SGL-1. The heights of columns "M-F-" are according to 100 %rel

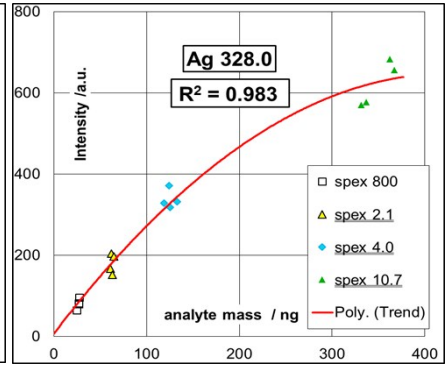
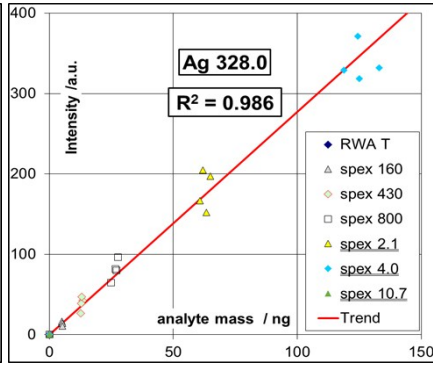
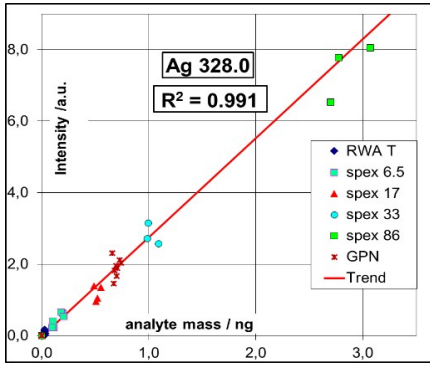


Figure S4 Calibration curves of Ag based on measurements of calibration samples (labelled with “spex”) containing oxidic analytes having mass fractions, expressed in $\mu\text{g kg}^{-1}$ (not underlined values) or in mg kg^{-1} (underlined values), respectively. “Trend” = linear approximated calibration functions, “Poly (Trend)” = quadratic approximated calibration function. “GPN” = graphite material (see section “Graphite powders used for analysis”).

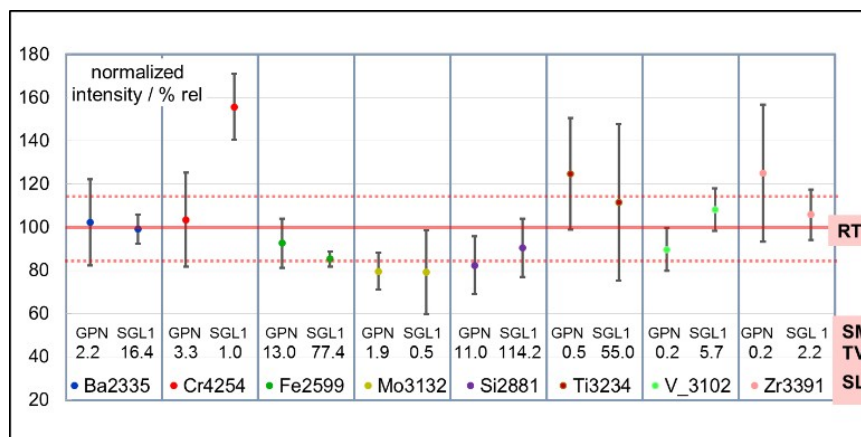


Figure S5 Examples of comparison between normalized target and normalized measured values of 8 analytes in the graphite materials GPN and SGL-1 as a “snapshot” of 3 measurements. RT = relative target value (= 100 %), SM = sample material, TV = absolute target value / mg kg^{-1} , SL = element, spectral line / 0.1 nm. Uncertainty bars = SDs of mean values.

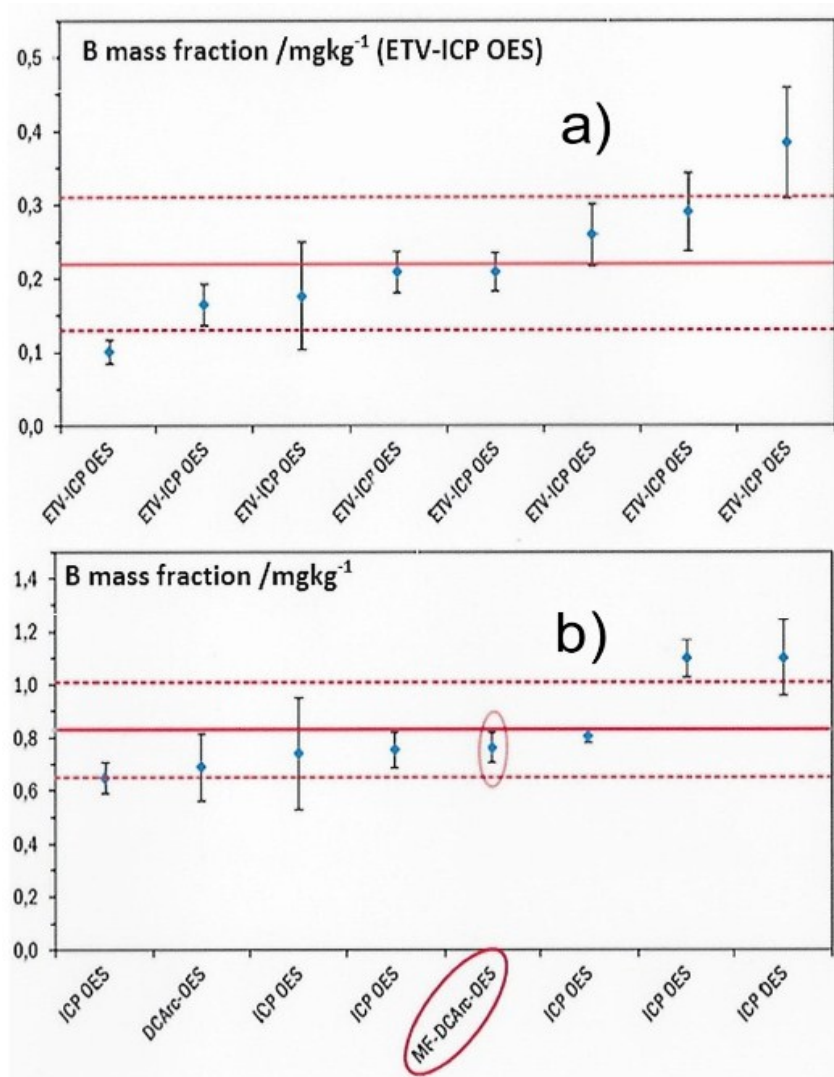


Figure S6 Evaluation diagram for the analyte B of the inter-laboratory comparison for certification of pure graphite NBG-18. Note the different scaling of the ordinates for results of a) ETV-ICP OES and b) all the other methods! (The corresponding diagram of the BAM Certification Report⁴² was adapted).

