

## Influence of the binder used in pressing ash for laser sampling on the quality of analytical signals of the elements detected

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### Abstract

This work is devoted to determining the chemical composition of coal ashes. We used the optical emission spectrometry with inductively coupled plasma and laser sampling as a research method. The aim of the work is to determine the limits of detection (LoDs) and quantitative determination (LoQs) of elements in ashes using polyvinyl alcohol (PVA) and microcrystalline cellulose (MCC) as binders. In this work, analytical signals of Al, Ba, Be, Ca, Cr, Cu, Fe, K, La, Li, Mg, Mn, Na, Ni, P, Pb, S, Sc, Sr, Ti, Y, V, Zr, and Zn were analyzed in tablets obtained from the standard samples ZUK-1, ZUK-2, SG-1A, SG-3, SGD-2A, and SO-1, compacted using PVA and MCC, as well as from binding agents themselves. To obtain compact materials based on fly ash and geological materials, both binders are suitable if their chemical purity is enough for analysis. However, when using both MCC and PVA, some drawbacks were identified. The intensities of analytical lines of the elements were determined lower during the ablation of compact ashes with MCC than with PVA. The signal-background ratio is lower when using MCC as a binder material compared with compacts based on PVA. However, the highest grade PVA according to GOST 10779-78, used in the work, contains an admixture of sodium, about 0.06 w. %, which interferes with quantitative measurements if the sodium content in the sample is comparable to this value, which can be extremely rare in the analysis of fly ashes.

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