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## REE interferences in standard solutions – consequences for aqueous analyses by ICP-MS

Determination of rare earth elements (REE) concentrations in various types of environmental samples, especially aqueous matrices, requires the use of high-quality standard solutions. The standard market offers single- and multi-element standards, and the latter may seem more practical for routine testing. However, in the case of determining REE using the Inductively Coupled Plasma Mass Spectrometry technique, significant interferences may occur from other elements of this group. The presence of many REE in one sample may therefore result in measurement disturbances, which are to be the basis for instrument calibration, validation/verification of the measurement method or confirmation of the validity of analysis results.

The work focuses on the elements from the REE group with the largest number of isotopes (Nd, Sm, Gd, Dy). A comparison of signals obtained for these elements from single and multi-element standard solutions prepared on the basis of deionized water in the concentration range from 0.005 µg/l to 50 µg/l using the ICP-MS analytical technique was made. Based on the intensity of signals measured directly by the instrument detector and the comparison of isotope ratios, the effects of the mutual influence of elements from the REE group on the measured signal values were assessed.

The analysis showed that the presence of neighboring REE elements significantly affects the signal of some analytes. This applies in particular to elements such as Nd and Sm. The results suggest that the use of multi-element standards without control of the mutual interactions between elements can lead to erroneous conclusions at the stage of validation of the measurement method, and consequently also in subsequent routine environmental analyses based on it.

**Keywords:** REE, standard solutions, interferences, method validation

**Biography**

I am a second-year PhD student in the discipline of Earth and Environmental Sciences at the Faculty of Geology, Geophysics and Environmental Protection, AGH University of Krakow. My area of scientific interest is hydrogeochemistry, in particular with methodological aspects of determining REE in groundwater.



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