

ANALYSIS OF PLATINUM GROUP ELEMENTS (PGE) BY MEANS OF TOTAL REFLECTION X-RAY FLUORESCENCE (TXRF) SPECTROMETRY

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Platinum group elements (PGE) are of crucial importance in many industrial and medical application fields. For the cost-effective exploration and mining of PGE, an accurate and fast analysis of these elements must be ensured. That applies to industrial applications of PGE as catalysators too. Here, the concentrations of PGE must be controlled with regard to process control, recycling processes or contamination control.

A special application is the use of PGE distributions in rocks, minerals and meteorites in order to investigate and understand geological processes.

In addition, PGE are used in medicine for cancer treatment by chemotherapy. The important analytical task is the continuous control of PGE concentrations in blood, serum and the cancer drugs themselves.

For the accurate analysis of PGE common analytical techniques face a number of difficulties. Applying wavelength XRF, the sample preparation is often complicated, the number of certified reference standards is limited and the detection limits are not sufficient in many cases. Atomic spectroscopy strictly requires digestion of the sample material. Additionally, there is always the risk of long system down-times after a concentrated sample was introduced accidentally.

In contrast TXRF is an ideal technique for PGE analysis due to the ability to process solid and liquid samples. Major benefits are the quantification, based only on internal standardization, and a broad analytical range, which allows the accurate analysis from low ppb up to % concentrations.

A low-power benchtop TXRF spectrometer was used for the analysis of different sample types including Pt-bearing ores, catalysts, wash-coats, blood and docimastic digestion solutions. The results clearly indicate the suitability of this technique for an accurate PGE analysis in different sample types.