


Original Article

A Rapid Method for the Determination of Gold in Rocks, Ores and Other Geological Materials by F-AAS and GF-AAS After Separation and Preconcentration by DIBK Extraction for Prospecting Studies

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Abstract

A solvent extraction method using diisobutyle ketone (DIBK) is designed for the accurate and precise estimation of very low concentrations of gold in rocks, ores and other geological samples. 30 g sample was digested using aqua regia after roasting and gold content was extracted into DIBK phase consisting of AliquatTM 336 and estimated by flame atomic absorption spectrometer (F-AAS). Samples having gold concentration <0.1 µg/g were estimated using graphite furnace atomic absorption spectrometer (GF-AAS). Results of DIBK extraction were compared to those obtained by other well established methods, such as classical Pb-fire assay and methyl isobutyl ketone (MIBK)-AAS methods. Comparison was also made with results obtained by the direct determination of gold by inductively coupled plasma mass spectrometry (ICP-MS) technique. The analytical results for international gold reference materials measured by the proposed method were in close agreement with those obtained by other well established methods and recommended values. Detection limits (20 ng/g by F-AAS, 0.1 ng/g by GF-AAS and 0.01 ng/g by ICP-MS) of gold (3 σ × total procedure blank) is very low and could be further improved by using high pure acids and other reagents.

Keywords

Determination of gold – Solvent extraction – Atomic absorption spectrometry – Fire-assay method – ICP-MS – Gold exploration – Bore hole samples