Determination of rare elements in rock samples by Inductively Coupled Plasma Mass Spectrometry

TIE-FU WANG[1] PEI-XI ZHENG[2] AND YAN ZHOU[1]

[1]Center of Analysis and Testing Jilin University Changchun China 130026

[2]College of Earth Sciences Jilin University Changchun China 130061

Rare elments are important elments in rocks, it can indicate the diagenesis environment and tectonic settings. so it is important to exactly determining. In the past, it only deteminate buy ICP-AES or AAS. but this instrmnents detection limit are hight comparatively content in sedimentary. Iductively Coupled Plasma Mass Spectrometry (ICP-MS) have low comparatively, it is the right detemination instrument.

A method for the determination of Rare elements in rocks was proposed by Iductively Coupled Plasma Mass Spectrometry (ICP-MS). The ICP-MS (Agilent 7500a) running conditions: RF power 1350W; Carrier gas flow rate 1.2L/min; Spray chamber temp 2°C; Sample flow rate 0.1ml/min; Sample depth 7mm.

In the determination of the method, we analyse elements. The sample was dissolved in mixed acids with pressurized sample digestion and an appropriate amount of mannnitol was added to prevent boron from volatilization. Analytical mass number were carefully selected and the instrumental operating conditionswere optimized. The detection limits of the method for the elements were 0.0001-0.003mg/L. The method has been applied to the determination of these elements in National Standard Reference Materials including GBW and BCR. The results obtained were in agreement with the certified values with recovery of 90.3%-110% and precision of less than 5% RSD (n=3).

So this technique has a lot of advantages, such as high accuracy and precision, low limit, and high analytic speed etc. We draw a conclusion that using ICP-MS, we can get satisfactory results.

[1] Zheng PX, Zhou Y, Wang TF *et al*. (2008) Determination of trace elements in sedimentary rock samples by Inductively Coupled Plasma mass spectrometry [J]. *Geochimica et Cosmochimica Acta*. **72**(12) A1097-A1097.

Identification of intrusions by fusion of geo-information from geochemical and geophysical datasets

W. WANG[1]* AND Q. CHENG[1,2,3]

[1]Department of Earth and Space Science and Engineering, York University, 4700 Keele St., Toronto, Ontario, Canada M3J1P3 (*correspondence: bznb@yorku.ca)

[2]Department of Geography, York University, 4700 Keele St., Toronto, Ontario, Canada M3J1P3 (qiuming@yorku.ca)

[3]State Key Laboratory of Geological Processes and Mineral Resource, China University of Geosciences, Wuhan, Beijing, China

Based on existing literature [1], granite intrusions are believed to be important controlling factors of mineralization in the Gejiu Sn-Cu polymetallic ore district. This knowledge about intrusions benefits future exploration.

From stream sediments geochemical data, elements associated with intrusions can be recognized through principal components analysis (PCA). Calculated scores of element association describe the surface chemical properties of areas influenced by intrusions. Singularity index can identify the material enrichment and depletion produced by the various geological activities [2]. From the viewpoint of singularity, intrusions present low gravity and high magnetism in regional scale geophysical data and are currently interpreted, respectively, as depletion of high density materials and enrichment of magnetic materials. This paper applies singularity index mapping technique for gravity data and aeromagnetic data to analyze the physical properties of subsurface intrusions.

In order to comprehensively describe the distribution of intrusions, PCA is used further to integrate surface signatures of intrusions from geochemical data with subsurface signatures of intrusions from geophysical data. Contributions of gravity, aeromagnetic and geochemical associations assist to select a principal component representing the intrusions, the patterns of which indicate presence of surface to subsurface intrusions as supported by both physical and chemical properties.

[1] Zhuang *et al*. (1996) *Geology of Gejiu Tin-Copper Polymetallic Deposit*, Earthquake Publishing House.
[2] Cheng (2007) *Ore Geology Reviews* **32**, 314–324.