Study on determination of rare earth elements in multi-mineral phase soil by inductively coupled plasma mass

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Soil is a basic construction unit in terrestrial ecosystem, and also is the junction of the matter energy circulation in ecosystem. It is not only the most acitive environment factor on earth, but also is the cherishable renewable resource. But If the system is polluted, not only the plants outputs and qualities will be affected, but the atmosphere and the water circumstance will also be affected.

The soil's main components is mineral substances, organic contents, live organic bodies, moisture, atmosphere and etc. The mineral substances weihgt occupy the solid phase weight (soil dry weight) of 90%~95%,. So the main components in soil is mineral suvstances. In deposit diggings, That make pollution in the soil around the diggings. because of the exploitation, around soils were unavoidable polluted. It make soil have more Multi-mineral. So The Multi-mineral phase soil is the main polutting soil in diggings.

Using inductively coupled plasma mass (ICP-MS), we can exactly analysis the content in multi-mineral phase soil. In the determination of the method, we analyse 30 elements including trace elements and rare earth elments. 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 07105-GBW 07108. 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).

[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.

The study of Quaternary groundwater recharge in Turpan Basin, NW-China

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Turpan Basin is located in NW-China which belongs to continental arid zone. On the northern and western edge of the basin is Tianshan Mountain. The Quaternary groundwater is the main water source for drinking, agricultural and industrial uses. In this paper, the recharge of Quaternary groundwater is studied using isotopic techniques.

The δD of Quaternary groundwater in the Turpan Basin ranges from -56 ‰ to -60 ‰ (SMOW) and the $\delta^{18}O$ varies from -8.7 ‰ to -9.2 ‰. Since the local meteoric water line of the Turpan Basin is still unknown, the local meteoric water line$\delta D = 7.2\delta^{18}O + 10.6$ of the Junggar Basin which has similar geographic and climatic conditions with the Turpan Basin is applied. The measured data are showed in Figure 1.

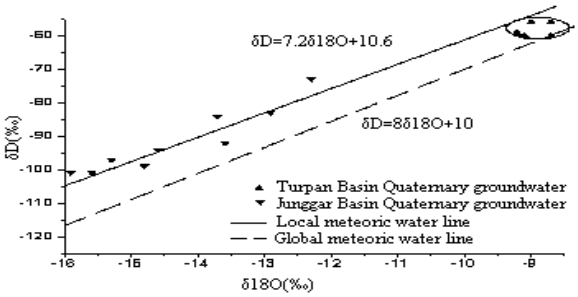

Figure 1: The δD-$\delta^{18}O$ correlation for Quaternary groundwater in the Turpan Basin

It is clear from Figure 1 that the measured isotopic data points of Quaternary groundwater in the basin lie between the global meteoric water line and the local meteoric water line, which indicates that the Quaternary groundwater in the basin is of meteoric origin. So we can draw a conclusion that the precipitation from the Tianshan Mountain is the major source of Quaternary groundwater in the Turpan Basin.

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