Automated γ-ray spectrometer for monitoring wastes made by non-nuclear industries

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The huge amount of naturally occurring radioactive material (NORM) worldwide generated shows a high level of complexity for disposal purposes because of the high variability of radioactivity enrichment, therefore a case-by-case control is required. We developed a fully automated high-resolution gamma-ray spectrometer, called MCA_Rad system [1], which offers a suitable measurement technique for monitoring huge amounts of NORM. Two coupled HPGe detectors p-type with 60% relative efficiency are accurately shielded allowing to reach an environmental background reduction of two orders of magnitude. Through fully automation of operational processes up to 24 samples can be measured without any human attendance. The absolute efficiency of the MCA_Rad system is estimated by using two point sources, ^{152}Eu and a ^{56}Co and validated at 5% of relative uncertainty by measuring certified reference materials.

[1] G. Xhixha *et al*., 2013 J Radioanal Nucl Chem 295:445–457. doi: 10.1007/s10967-012-1791-1

Study on sulfur isotopic composition of acid rain in Nanchang City,China

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The acid rain is sulfuric acid type acid rain in Jiangxi province Nanchang City, its sulfur isotopic composition are different from that of other Cities.

We analyzed the sulfur isotopic composition of rain water from Nanchang City in this paper(**Fig 1**). The results indicated that the sulfur isotopic composition possesses a seasonal variation trend, isotopically heavier in spring and summer, lighter in autumn and winter. The sources of sulfur in rain water include bio-organic sulfur, anthropogenic sulfur and sulfur from the sea. In spring and summer, the sulfur in rain water comes mainly from anthropogenic sulfur. In autumn and winter,the sulfur in rain water dominantly originates from bio-organic sulfur. The sulfur in rain water from the sea may be very small in percentage.

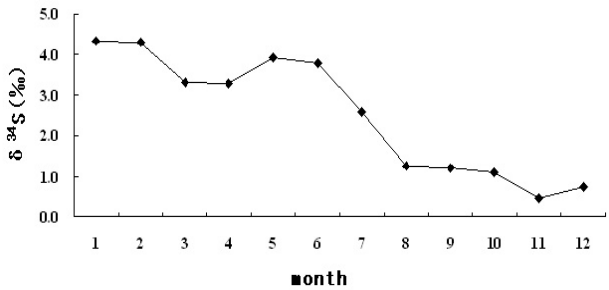

Fig. 1. Seasonal variations in sulfur isotopic composition of the precipitation

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