Raman spectroscopic feature of the noble gas carrier Q in meteorites

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The phase Q contains most of the heavy noble gases in primitive meteorites although it is only 0.02-0.04 % of the meteorites (Lewis *et al*. 1975). Q is most likely carbonaceous matter although the precise feature of Q is still unknown. Here we report Raman spectroscopicresults of Q-rich fractions from the Allende meteorite, which were prepared with two different methods.

We made the Raman spectroscopic measurement of the chemical residue and the oxidized residue of Allende that were newly prepared. We also made measurement of several fractions of the "floating fraction"C1-8 that were obtained by colloidal and density separation in Amari *et al*. (2003). Matsuda *et al*. (1999) firstly found that the black material that floated on the water surface during the freeze-thaw method was similar to the chemical residue in noble gas features. Amari *et al*. (2003) further applied the colloidal and density separation to the "floating fraction" C1-8 and found that half of Q in this fraction was concentrated in the fraction C1-8D with the density of $1.65\pm0.04 g/cm^3$. We made measurement of Raman spectroscopy of C1-8D and also other different density fractions; C1-8J ($1.1\text{-}1.6 g/cm^3$), C1-8G ($1.97\pm0.06 g/cm^3$) andC1-8K ($2.2\text{-}2.3 g/cm^3$).

Raman spectra were obtained in Tokyo Medical and Dental University using 532nm YAG laser (5-6mW at the sample surface). We performed measurements of five to eight spots in each sample. The typical Raman spectrum of graphitic carbon (G band of about $1580cm^{-1}$ and D band of about $1350cm^{-1}$) was obtained in our all samples, which is common in the carbon material in carbonaceous meteorites.

We compared these Raman spectroscopic features of the acid residue (containing Q), oxidized residue (not containing Q) and the density separated floating fractions(being enriched and depleted in Q) of the Allende meteorite. As a result, we have concluded that Q is the graphitic carbon with the crystal size of about 50-60Å from the Raman features.

Impact of human population on heavy metal concentration of stream sediments in the Trinity River, Texas, USA

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Introduction

The river sediment is basically composed of clastic materials derived from the surface of the Earth. Purpose of our study is to clarify the quantitative estimation of ratio of influence given to river sediment of nature and human activity by using of heavy metals [1, 2]. Trinity River is one of the biggest rivers which flows through Dallas and Fort Worth two big cities of USA and are highly populated. Trinity River drains into the Gulf of Mexico.

Results and discussion

Sediment samples collected from various points along the upper and lower streams were subjected to content analysis and elution analysis (using liquate (flow) out test) on the heavy metals like Cd, CN, Pb, Cr, As, Hg, Ni, Zn and Cu from the river sediment for the purpose of environment assessment. A total of 22 sample points were identified from upper stream to lower stream and samples were collected such that almost the whole stream length of Trinity River is covered. Results show that heavy metal content through out the river stream is below the recommended limits posing no immediate environmental threat. However, the experimental results show clear impact of human population in bigger cities on heavy metal concentrations in the river sediments as compared to smaller cities with low human population. It could be seen from the analysis that all the heavy metals show relatively high content and high elution value in Dallas and Fort Worth. As we move away from the big cities, the value of content and elution of sediment decreased by natural dilution effect by the river.

[1] Watanabe *et al*. (2005) *GCA*, Abstract Vol. **194** S66. [2] Matsumoto (2007) *International Symposium Restoration and Sustainability of Estuaries and Coastal Lagoons* (Matsue, Japan) Abstract Vol. 104-107.