

A Convenient Approach to Sub-10-12g/g Level Measuring of U and Th in Acrylic

Acrylic is widely used in low background experiments such as underground neutrino experiments and dark matter experiments around the world for its good transmittance, low radioactive background and good chemical compatibility with water and liquid scintillator. Jiangmen underground neutrino oscillation experiment (JUNO) has a 35.4 meters diameter 566-ton acrylic sphere shell for holding liquid scintillator. Its requirements for all three radioactive isotopes ^{238}U , ^{232}Th and ^{40}K are less than 1 ppt (10-12 g/g). A fast and reliable measuring method for acrylic samples is needed for the quality control. We have developed a method for concentrating the radioactive isotopes in the acrylic for several times, then the samples can be measured by ICP-MS. As a result, the sensitivity can reach sub-ppt level easily, effectively and quickly. In this talk, I will give more details about our technique of concentrating the radioactive isotopes and measuring method.

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