

Radioactivity measurement of high precise U and Th in different materials using ICP-MS

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In order to screen the materials for low background detectors for Jiangmen Underground Neutrino Observatory (JUNO) and future double-beta decay experiments, the natural radioactivity of some related materials requires measurement to sub-ppt level. The inductively coupled plasma mass spectroscopy(ICP-MS) is dedicated used to measure the materials with ultra-low radioactivity due to its high sensitivity to trace amounts of ^{238}U and ^{232}Th .

In this talk, we will introduce the precise measurement of U/Th in different materials using ICP-MS. We have successfully measured the U/Th in acrylic to sub-ppt level by vaporizing, and the method detection limit (MDL) at 99% confidence level can reach 0.04/0.09 ppt for $^{238}\text{U}/^{232}\text{Th}$ in acrylic. A co-precipitation approach to determine the sub-ppt level of Th and U in copper is developed using ICP-MS with the MDL reaching ~ 0.1 ppt ^{238}U in copper. The methods for other materials such as PI, SiO_2 , Teflon and PFA etc will also be introduced in this talk.

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