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Ultra-trace Th and U Measurements in Metals with Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

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This study established an optimized protocol employing quadrupole inductively coupled plasma mass spectrometry (ICP-QMS) with internal standard calibration to achieve direct ultratrace ^{238}U and ^{232}Th radionuclides quantification. Cross-validation with high-purity germanium gamma spectroscopy (HPGe) confirmed the method's reliability. Systematic ICP-QMS screening of industrial materials established the current baseline radioactivity in stainless steel and titanium metals. Through UTEVA resin enrichment, ^{232}Th and ^{238}U in copper were quantified at μBq/kg-level radioactivity. Impurity profiling across smelting stages demonstrated vacuum electron beam smelting's exceptional purification efficacy.

Collaboration you are representing

Author: ZHU, Yan (Shanghai Jiao Tong University)

Co-author: 张, 涛 (上海交通大学)

Presenter: ZHU, Yan (Shanghai Jiao Tong University)

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