同位素稀释-α能谱法测定水中微量铀及$^{234}U/^{238}U$比值

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测定了铀、钍、镤和铁于不同介质中在CL-5209萃淋树脂上的分配系数，拟定出分离这些元素的方法，建立起同位素稀释-α能谱同时测定水样中微量铀和$^{234}U/^{238}U$比值的新方法。

水样用硝酸酸化至pH～1，加入^{232}U示踪剂后，放置过夜，让铀同位素交换达到平衡。加入三氯化铁溶液，煮沸15分钟。加氨水至pH～8，使铀和氢氧化铁共沉淀。澄清后过滤。沉淀用20毫升2N HNO_3溶解。将溶解液以2毫升/分的流速通过装有1克70-100目CL-5209萃淋树脂的柱子，相继用20毫升1N HNO_3溶液洗铁、15毫升4N HCl溶液洗钍、30毫升4N HCl+0.06N HF溶液洗镤，再以10毫升0.3M草酸铵溶液淋洗铀。

用电沉积法把铀镀到镍片上制备薄源。将铀淋洗液倒入电沉积池内，于80℃、极距15毫米、电压1.2伏、起始电流强度1.0安培时，电沉积1.5小时。取出薄源，用蒸馏水洗净，烘干。

用高分辨率（对^{241}Am的5.486MeV峰分辨率为0.6%）的α能谱仪测量^{232}U、^{234}U和^{238}U的放射性强度。在测量^{232}U的放射性强度时，需对^{228}Th的贡献进行校正。

对铀浓度为2.4微克/升以上的矿泉水、地下水及海水样品进行过分析。取样量为10升时，测得$^{234}U/^{238}U$比值和铀含量的相对标准偏差小于±5%。

DETERMINATION OF THE URANIUM CONTENT AND $^{234}U/^{238}U$ ISOTOPE RATIO IN NATURAL WATER BY ISOTOPE DILUTION ALPHA SPECTROMETRY. Cen Yunhua, Chang Junxiao et al. (*The Beijing Research Institute of Uranium Ore Processing*) Separation of the uranium from Th, Pa, Fe and other elements by extraction chromatography is studied. A method is proposed for measuring uranium content and $^{234}U/^{238}U$ isotope ratio in natural water by Isotope Dilution Alpha Spectrometry (IDAS). Uranium is coprecipitated with $Fe(OH)_3$ by NH_4OH. The precipitate is dissolved in 2N HNO_3 and the solution is passed through a column packed with CL-5209 Levextrel resin. Rinse the column with 1N HNO_3 solution to strip iron, 4N HCl solution to extract thorium, 4N HCl+0.06N HF solution to extract protactinium. Uranium is then eluted by 0.3M $(NH_4)_2C_2O_4$ solution. After electroplating on a nickel disc, the uranium is determined by α-spectrometry. The precision of the determinations is $\geqslant \pm 5\%$ for ppb level of U.

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that the ratio of Sn/Cu is lower with the increase of depth within 100μm but the ratio of Pb/Cu does not obviously vary in this range. These two ratios become constant when the detection depth is more than 100μm. It can be expected that the surface composition of bronze mirror at certain depth will be able to represent the composition of mirror body when the X-ray fluorescence analysis technique is used.