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Preparation of samples for α-spectrometry by direct evaporation of extracted species

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Because of the energy loss of alpha particles by self-absorption, alpha spectrometry requires thin, uniform, and nearly weightless samples. Several methods exist for sample preparation e.g., electrodeposition, or co-precipitation. Unfortunately, the methods yielding the best energy resolution are not always quantitative and are usually relatively demanding and time-consuming. This fact makes application of alpha-spectrometry for screening tests with radiotracers complicated.
For its simplicity and fastness, the possibility to prepare samples for alpha spectrometry by direct evaporation was investigated in order to evaluate the efficiency of Am/Cm separation. The simple aliqouts of aqueous or organic phase, aliquots in the presence of an excess of volatile organic solvent (acetone) or mixed with tensioactive (tetraethylene glycol) were deposited on stainless steel planchets, evaporated under infrared lamp and heated in flame until glowed with dull red colour. The influence of sample preparation technique on counting efficiency and energy resolution has been investigated. The results show there is not one versatile technique, but the preparation should consider the particular composition of samples to be measured.

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