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Nuclear fuel technology — Dissolution of plutonium dioxide-containing materials —

Part 1: Dissolution of plutonium dioxide powders

Technologie du combustible nucléaire — Dissolution des matériaux contenant du dioxyde de plutonium —

Partie 1: Dissolution des poudres de dioxyde de plutonium

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Foreword

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Introduction

This document describes a method to dissolve powder samples of plutonium oxide to provide suitable aliquots for subsequent analysis of elemental concentration and isotopic composition.

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Nuclear fuel technology — Dissolution of plutonium dioxide-containing materials —

Part 1: Dissolution of plutonium dioxide powders

1 Scope

This document specifies the dissolution of powder samples of plutonium oxide for subsequent determination of elemental concentration and isotopic composition.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Summary of the method

Among the factors affecting the formation of solid solution and hence, the ease of dissolution are:

— the method of fuel fabrication (i.e. mechanically blended oxides, co-precipitated oxides, or sol-gel oxides);

— the degree of sintering.

Therefore, different dissolution methods are applied according to the type of plutonium oxide sample to be dissolved. For high-fired plutonium oxide procedure can be different.

The radiological hazard of plutonium and the need to minimize the waste shall be taken into account when choosing the mass of the sample to be dissolved. In most cases, PuO_2 masses between 0,1 g and 1 g are appropriate for the subsequent analysis.

For the highest possible assay accuracy only gravimetric dissolution methods are recommended. However for a less critical assay, volumetric dissolution may be appropriate.

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