ISO 12183:2016-08 (E)

Nuclear fuel technology - Controlled-potential coulometric assay of plutonium

Contents

Page

Foreword iv

1 Scope 1

2 Normative references 1

3 Termsanddefinitions 1

4 Principle 1

5 Reagents 2

6 Apparatus 2

7 Procedure 8
7.1 Plutonium determination 8
7.1.1 Weighing the test sample, with an uncertainty of ±0,01 %, K = 1 8
7.1.2 Preparation of the test sample 9
7.1.3 Electrode pre-treatment 9
7.1.4 Electrical calibration of the current integration system 10
7.1.5 Formal potential determination 11
7.1.6 Coulometric blank determination 12
7.1.7 Plutonium measurement 13
7.2 Analysis of subsequent test samples 13

8 Expression of results 14
8.1 Calculation of the electrical calibration factor 14
8.2 Calculation of the blank 14
8.3 Fraction of electrolysed plutonium 15
8.4 Plutonium content 16
8.5 Quality control 16

9 Characteristics of the method 16
9.1 Repeatability 16
9.2 Confidence interval 17
9.3 Analysis time 17

10 Interferences 17

11 Procedure variations and optimization 21
11.1 Accountability measurements and reference material preparation 21
11.2 Process control measurements 21
11.3 Measurement cell design 21
11.4 Electrolyte and electrode options 22
11.5 Test sample size 22
11.6 Background current corrections 22
11.7 Correction for iron 23
11.8 Control-potential adjustment 24
11.9 Calibration methodologies 24

Annex A (normative)Purificationbyanion-exchangeseparation 25

Annex B (normative) Determination of formal potential, E0 27

Bibliography 28