



# CERTIFIED REFERENCE MATERIAL IRMM-540R

## CERTIFICATE OF ANALYSIS

<b>Uranium-doped oxide glass</b>		
	Certified value <sup>1)</sup> [mg/kg]	Uncertainty <sup>2)</sup> [mg/kg]
Uranium mass fraction	15.0	0.9
1) The certified value is the unweighted mean value of the means of 8 accepted sets of data, each set being obtained in a different laboratory and/or with a different method of determination. The value is traceable to SI.		
2) Estimated expanded uncertainty, with a coverage factor $k=2$ , corresponding to a level of confidence of about 95 %, as defined in the Guide to the Expression of Uncertainty in Measurement (GUM), ISO, 1995.		

This certificate is valid until March 2015; this validity may be extended, as further evidence of stability becomes available.

### DESCRIPTION OF THE SAMPLE

Samples of IRMM-540R consist of a glass disc of 15 mm diameter and 2 mm thickness, polished on both sides.

### INTENDED USE

This CRM is intended to be used as a neutron fluence rate monitor for the purpose of age determinations of geological samples with the fission-track method. The CRM may also be used for uranium determinations in geological or other materials.

### STORAGE

No particular storage or handling instructions are to be followed to preserve the certified uranium mass fraction. However, the European Commission cannot be held responsible for changes that take place during storage of the material at the customer's premises, especially of opened samples.

### NOTE

This material replaces the exhausted IRMM-540.

Geel, January 2006

Signed: \_\_\_\_\_

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<b>Indicative Values</b>		
	Indicative value <sup>1)</sup> [g/g]	Uncertainty <sup>2)</sup> [g/g]
Isotope mass fraction of <sup>235</sup> U/ <sup>238</sup> U	7.161 10 <sup>-3</sup>	0.028 10 <sup>-3</sup>
<p>1) The indicative value is the natural <sup>235</sup>U mass abundance. Its value is confirmed with ID-TIMS measurements in 1 laboratory.</p> <p>2) The uncertainty is the expanded uncertainty of a confidence level of about 95 % (k = 2) of the ID-TIMS measurement results obtained on 2 samples, and is based on a full GUM-compliant uncertainty budget.</p>		

## ANALYTICAL METHODS USED FOR CERTIFICATION

- k<sub>0</sub>-neutron activation analysis
- Inductively-coupled plasma time-of-flight mass spectrometry
- Inductively-coupled plasma mass spectrometry
- Inductively-coupled plasma atomic emission spectrometry
- Energy-dispersive x-ray fluorescence
- Instrumental neutron activation analysis
- Isotope-dilution thermal ionisation mass spectrometry

## PARTICIPANTS

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- Philips Display Components, BTG Special Products, Eindhoven (NL)
- Universitaire Instelling Antwerpen, Wilrijk (BE)

## SAFETY INFORMATION

For some applications, IRMM-540R samples have to be irradiated. Depending on the flux to which the user submits IRMM-540R samples, it is possible to limit the residual long-lived activity of the glass so as to allow for safe fission track counting under an optical microscope.

## INSTRUCTIONS FOR USE

A minimum sample intake of 25 mg must be respected.

## LEGAL NOTICE

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## NOTE

A technical report on the production of IRMM-540R is supplied on the internet (<http://www.irmm.jrc.be/>). A paper copy can be obtained from IRMM on request.