



# Nuclear Reference Material Program

## U.S. Department of Energy



# Certificate of Analysis

## Certified Reference Material 004 (100g)

### Carnotite Ore

**Description:** Certified Reference Material (CRM) 004 consists of 100 grams of powdered carnotite ore in glass bottle.

**Table 1. Certified Property Value** <sup>(a)</sup>

U <sub>3</sub> O <sub>8</sub> Mass Fraction (g g <sup>-1</sup> ) •100:	0.178
Uncertainty:	0.022

<sup>(a)</sup> The reported numerical uncertainty is expressed as an expanded uncertainty at the 95 % level of confidence.

**Intended use:** This CRM was prepared to test procedures for chemical analysis of uranium in ore type samples.

**Storage:** This material should be stored in its original packaging under normal laboratory environmental conditions.

**Period of validity:** When stored in its original, unopened container, the certification of this material is valid indefinitely. The Nuclear Reference Material Program (NRMP) will notify customers should any degradation be detected.

**Traceability statement:** The certified mass fraction value for U<sub>3</sub>O<sub>8</sub> is metrologically traceable to the SI unit kilogram.

**Instructions for handling:** The material in the unit bottle is radioactive. This radioactive material should be handled only by qualified individuals. To minimize personnel exposure, appropriate facilities and personal protective equipment should be used. Refer to the Safety Data Sheet for further information.

**Additional information:** The property value was determined as the mean value of result from 5 laboratories (10 data sets total). Several uranium mass fraction analysis methods were used for these measurements, including colorimetry, cupferron separation with potassium dichromate and ceric titrations, fluorescence, and radioactivity.

In 2016, the New Brunswick Laboratory facility was transitioned to a program office within the Department of Energy and is now operating within the National Nuclear Security Administration (NNSA) as the Nuclear Reference Material Program (NRMP).

**Measurement uncertainties:** The expanded uncertainty for U<sub>3</sub>O<sub>8</sub> mass fraction value was determined by a Linear Pool evaluation of the data sets provided by the analysis laboratories.