

# National Bureau of Standards

## Certificate of Analysis

### Standard Reference Material 1878

#### Respirable Alpha Quartz (Quantitative X-Ray Powder Diffraction Standard)

This Standard Reference Material (SRM) is intended for use in preparing calibration standards for quantitative analysis of  $\alpha$ -quartz by x-ray powder diffraction methods according to NIOSH Analytical Method P&CAM 259<sup>(1)</sup> or equivalent methods.

The certified crystalline purity as determined by a modified spiking quantitative x-ray diffraction (XRD) technique for determination of amorphous SiO<sub>2</sub> content is

95.5 ± 1.1 wt. % crystalline  $\alpha$  quartz

No other crystalline phases were detected by XRD analysis.

The homogeneity of this reference material was found to be acceptable by three independent techniques: particle size distribution measurements, lattice parameter measurements, and XRD intensity ratio measurements.

The development and evaluation of this SRM were performed in the Gas and Particulate Science Division of the Center for Analytical Chemistry and in the Inorganic Materials Division of the Center for Materials Science under the directions of R.L. McKenzie and C.R. Hubbard, respectively.

Support for material development research and evaluation was provided by the Chemical Reference Laboratory, Division of Physical Science and Engineering, National Institute for Occupational Safety and Health.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R.K. Kirby.

Washington, D.C. 20234  
November 3, 1983

Stanley D. Rasberry, Chief  
Office of Standard Reference Materials

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Supplemental (NON—CERTIFIED) information on the quartz powder:

The equivalent spherical diameters as determined by a sedimentation method were found to be in the range 0.33 to 5  $\mu\text{m}$  (95% by mass of the particles). The mass mean equivalent spherical diameter as determined from these measurements is 1.62  $\mu\text{m}$ .

Using  $\text{CuK}\alpha$  radiation ( $\lambda = 1.5405981 \text{ \AA}$ ) the lattice parameters at 26 °C and the reference intensity ratio against silicon (SRM 640a) were found to be  $\langle a \rangle = 4.9135 \text{ \AA}$ ,  $\langle c \rangle = 5.4056 \text{ \AA}$ , and  $\langle \text{RIR}_{\text{q, Si}} \rangle = 0.91$ .

#### Caution

This SRM is not intended for use as a particle size reference material because it agglomerates very easily during handling and storage resulting in an unpredictable and uncharacterized powder size distribution.

This SRM is intended for "IN VITRO" analysis only.

#### Reference

- (1) NIOSH Manual of Analytical Methods, Volume 5, may be ordered from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 or the National Technical Information Service, Springfield, VA 22161.