

Certificate of the Reference Material

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Name of the Material : Porous SiO₂
Material Code : UME CRM 1503
Issue Date : 11.10.2021
Revision Date : 28.11.2024 (Revision history can be found on the last page)
Validity Period of the Certificate : 12 months from the sales date.
Certified Values :

Parameter	Certified Value ^[1] (m ² g ⁻¹)	Uncertainty ^[2] (m ² g ⁻¹)
BET Specific Surface Area	377.9	5.6

- [1] The certified value is the mean value of total 18 measurement results obtained from four units by two laboratories, using ISO 9277:2010 method.
- [2] The expanded uncertainty of the certified value includes the characterization, homogeneity and stability components and is the result of the standard measurement uncertainty multiplied by the coverage factor $k = 2$, which provides approximately 95 % confidence level for the normal distribution. The standard uncertainty of measurement has been determined in accordance with the GUM "Guide to the Expression of Uncertainty in Measurement" document.

TÜBİTAK UME, as a reference material producer, has been accredited by TÜRKAK according to TS EN ISO 17034 with the accreditation number AB-0001-RM.

Sales Date



Assoc. Prof. Mustafa ÇETİNTAŞ
Acting Director

The following pages are an integral part of the certificate. The use of current certificate is customers' responsibility.

Most recent certificate can be downloaded from www.ume.tubitak.gov.tr.

Description

Material is a white solid powder of 5 g porous silicon dioxide (SiO₂) in a screw-capped brown glass bottle. Additional information is given in the certification report.

Intended Use

The reference material is intended to be used for the calibration, verification and control of instruments used for determination of the BET specific surface area by static volumetric method.

Instructions for Use

Before opening and taking a sample, the bottle should be shaken to re-homogenize the content. Minimum sample intake is 200 mg. After use, the bottle should be immediately and tightly recapped.

Outgassing of the sample (200-500 mg) has to be carried out in a vacuum. Starting from room temperature, the sample has to be heated up to 350 °C (623.15 K) in vacuum with a rate of 5-10 °C/min followed by degassing the sample at 350 °C for at least 6 hours. The final pressure should be 1-5 Pa. The measurements should be carried out at a temperature of -195.85 °C (77.3 K) using N₂ as probe gas. The first isotherm data point should be taken at $P/P_0 = 0.01$, and the last isotherm data point should be taken at $P/P_0 = 0.35$.

Details of the multipoint BET value calculation are presented in the certification report.

Storage Conditions

The material should be stored at (21 ± 3) °C in a dry place.

This material can be safely dispatched under conditions where the temperature does not exceed 18 °C for up to four weeks.

TÜBİTAK UME cannot be held responsible for changes that might happen to the material at customer's premises due to non-compliance with the instructions for use, and the storage conditions given in the certificate.

Safety Information

The usual laboratory safety measures apply as in the case of similar powders.

It is strongly recommended that the material must be handled and disposed according to the safety guidelines where applicable.

It is recommended to avoid inhalation of powder material and work under appropriate ventilation conditions, gloves and dust masks should be used. Please refer to the Safety datasheet (SDS) before any use of the material.

Participants

The laboratories participated in the characterization study are given in the table below.

Laboratory	Address
TUBİTAK UME	TÜBİTAK Gebze Yerleşkesi, Barış Mahallesi, Dr. Zeki Acar Caddesi No.1, 41470 Gebze - Kocaeli / Türkiye
UNIIM	Ural Research Institute for Metrology, Krasnoarmeyskaya Ulitsa, 4, Yekaterinburg, Sverdlovsk Oblast, 620000, Russia

Methods and/or Techniques Used for the Determination of the Certified Values

Methods and techniques used in characterization studies are given below.

Method/Technique	Parameter
ISO 9277:2010 Brunauer, Emmet and Teller (BET) model	BET Specific Surface Area (m ² g ⁻¹)

Revision History

Date	Remarks
11.20.2021	First issue.
28.11.2024	Certificate is updated to adapt it to with the current format of certificate for reference materials.