



REFERENCE MATERIAL DOCUMENT

REFERENCE MATERIAL BAM-P206

Polyethylene terephthalate (microplastic powder)

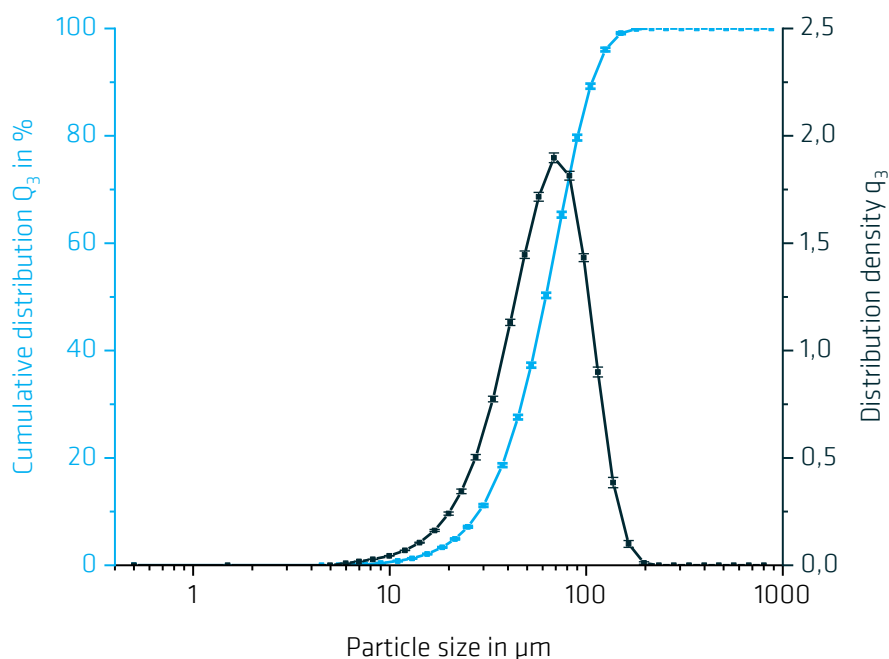
Particle size distribution – property of interest

| Particle size distribution | Equivalent particle diameter ² in μm | Expanded uncertainty ³ U in μm |
|----------------------------|---|--|
| D10 ¹ | 30.5 | 2.3 |
| D50 ¹ | 62.6 | 1.9 |
| D90 ¹ | 107 | 4 |

¹ Equivalent particle diameter D10/D50/D90 of the measured volume below which 10.3/50.3/90.3 % of the particles fall below.

² Mean values determined by laser diffraction under dry dispersion with three different devices measuring 4 units 3 times each. For further information see the characterization study for the property of interest in the report for BAM-P206.

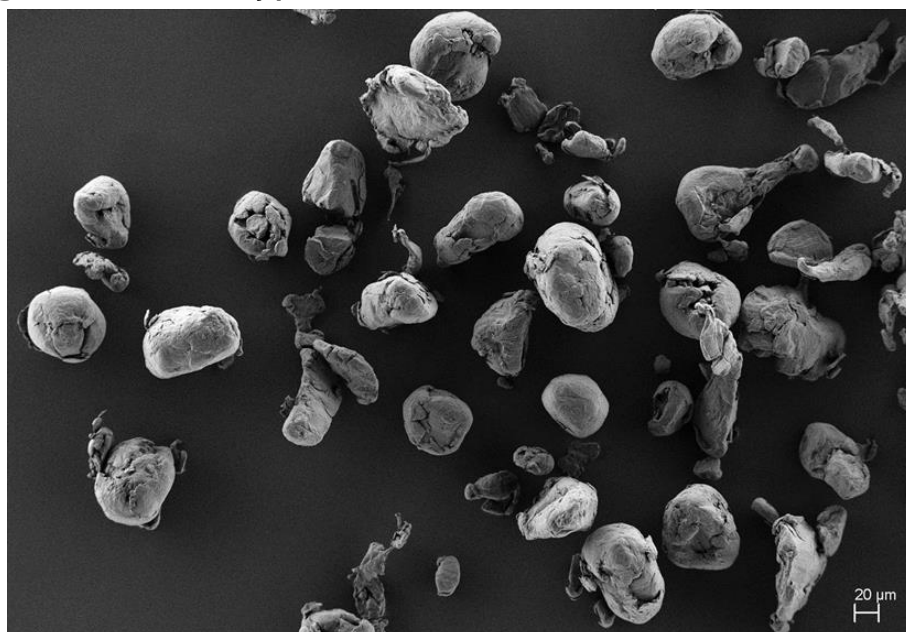
³ Estimated expanded uncertainty $U = k \cdot u_c$ with a coverage factor $k = 2$, corresponding to a level of confidence of approximately 95%, calculated according to ISO Guide 35. The combined uncertainty u_c includes the standard uncertainty due to characterization, the contribution of variation between bottles and the long-term stability contribution.



Equivalent particle diameter with standard deviation from homogeneity study of RM BAM-P206. 10 individual bottles of BAM-P206 were randomly selected and measure 3 times each. The blue curve represents the cumulative distribution $Q_3(x)$ and shows the volume fraction of particles smaller than x in relation to the total volume. The black curve represents the distribution density $q_3(x)$ (1st derivate of Q_3) and displays the probability of finding a particle with an equivalent particle diameter x in the population. For further information please see the corresponding report for P206.

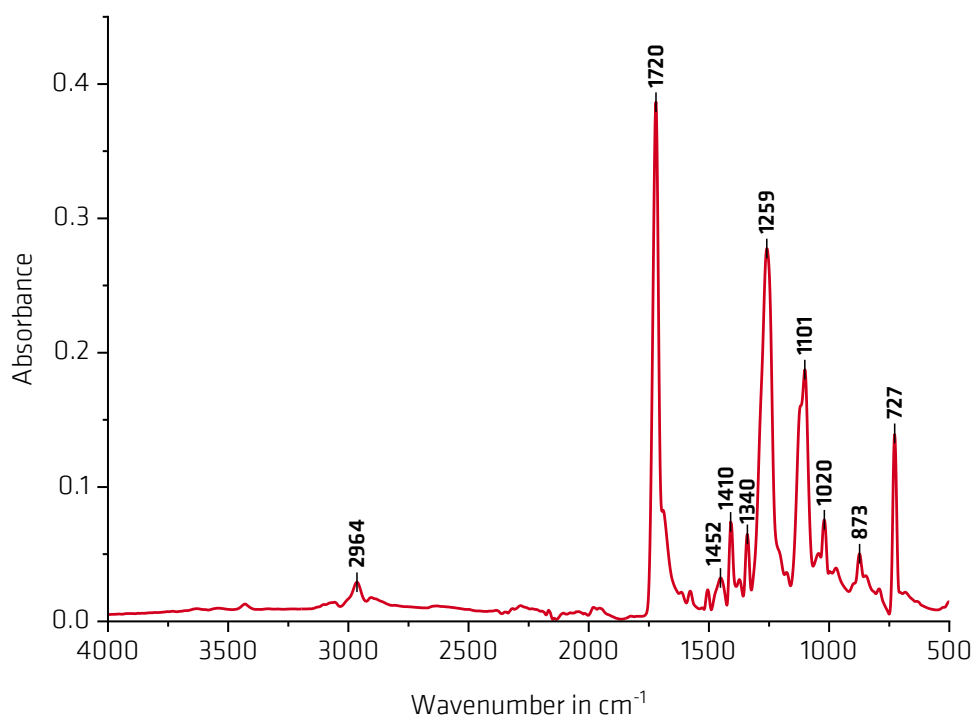
Additional Properties

Scanning electron microscopy (SEM)



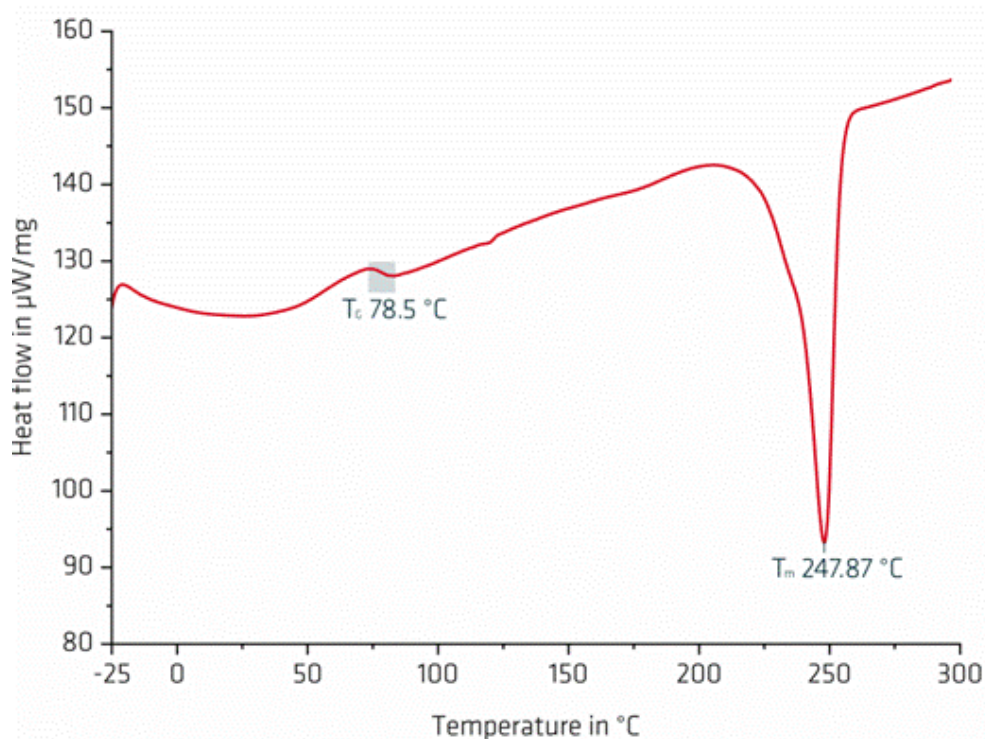
SEM image of BAM-P206 particles. Recorded with SEM (Zeiss Supra 40, Oberkochen, Germany) with a Schottky field emitter and equipped with a high-resolution In-lens SE (secondary electrons) detector with an acceleration voltage of 1.0 kV.

Attenuated total reflection – Fourier transform infrared spectroscopy (ATR-FTIR)



ATR-FTIR spectrum of RM BAM-P206. Average value spectrum of 32 scans of BAM-P206 by Attenuated total reflection – Fourier transform infrared spectroscopy (Nicolet Nexus 6700 FTIR spectrometer equipped with SmartOrbit Diamond and DTGS Detector, ThermoScientific, USA).

Differential scanning calorimetry (DSC)



Measurement of BAM-P206 by Differential scanning calorimetry (DSC 7020, Seiko, THASS, Germany) with a constant heating rate of 10 K/min.

| Parameter | Temperature in °C | Standard deviation <i>s</i> in °C | Rel. standard deviation <i>s</i> in % |
|------------------------------------|-----------------------------|---|---|
| Glass transition temperature T_g | 78.5 | 0.5 | 0.7 |
| Melting temperature T_m | 247.87 | 0.03 | 0.01 |

Average values for glass transition T_g and melting temperature T_m of BAM-P206 determined from three DSC measurements at a heating rate of 10 K/min.

End of Validity

This document is valid for two years after dispatch, provided that the reference material is stored under the recommended conditions.

Date of dispatch: _____

Material Description

The reference material BAM-P206 consists of PET powder and is delivered in an amber glass bottle with metal lid. The seal in the metal lid is made of silicone and polytetrafluorethylene. The bottled mass is at least 1.0 g.

Recommended Use

BAM-P206 is developed as a reference material close to reality for the validation of sampling, sample preparation and detection of microplastics. It can be used either for the evaluation of effects in the field of ecotoxicology or human toxicology, pollutant transport and agglomeration behaviour related to microplastics.

Transport, Storage and Handling

BAM-P206 can be transported at ambient temperature. The material should be stored in a dark, dry and cool (5 ± 3 °C) environment in its original tightly closed bottle. BAM cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially of opened bottles. There are no special safety regulations to be followed.

Literature

A detailed technical report describing the analysis procedures and the treatment of the analytical data used to characterize BAM-P206 is available on request or can be downloaded from BAM website (<https://rrr.bam.de>).

Accepted as a BAM-RM on December 20, 2023

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