



Batch #Py-0001

12 common polymers in CaCO₃ diluent

This Certificate of Analysis (COA) refers to the pyrolysis gas chromatography-mass spectrometry (Py-GC/MS) calibration standard, Batch #Py-0001, containing twelve polymer types dispersed in a CaCO₃ diluent.

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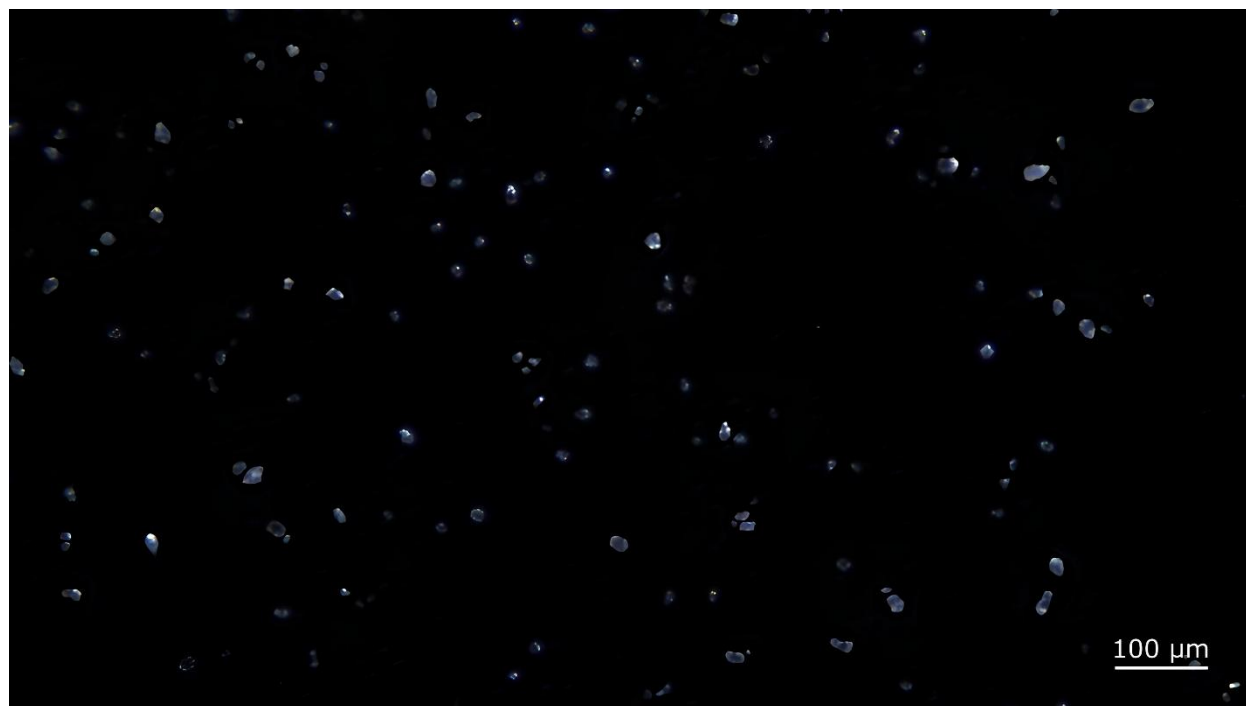
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1. Introduction

The polymers are provided as microplastic (MP) fragments with a maximum diameter of approximately 50 µm, obtained by sieving through a 300-mesh grid (Fig. 1). The MP fragments are then weighed and dispersed in the chosen diluent (CaCO₃ or SiO₂), ensuring a traceable distribution of polymer mass within the matrix.

Fig. 1: Photomicrograph captured under critical-angle darkfield illumination (CADLFI) of LDPE fragments sieved through a 300-mesh grid.



Each MP fragment weighs less than 10 ng; therefore, 1 µg of MP powder typically consists of at least 100 particles. This ensures reliable particle dispersion within the CaCO₃ matrix. To ensure homogeneity, all powders are mechanically mixed for 24 hours using continuous agitation.



1.1. Abbreviations

COA	Certificate of Analysis
Py-GC/MS	Pyrolysis gas chromatography mass spectrometry
MP	Microplastic
mg	Milligram
µg	Microgram
MW	Molecular weight
LDPE	Low-density polyethylene
HDPE	High-density polyethylene
PP	Polypropylene
PVC	Polyvinyl chloride
PET	Polyethylene terephthalate
PS	Polystyrene
PC	Polycarbonate
ABS	Acrylonitrile butadiene styrene
PMMA	Polymethyl methacrylate
PA6	Polyamide 6
PA6,6	Polyamide 6,6
PU	Polyurethane [thermoset]
TPU	Polyurethane [thermoplastic]



2. Sample contents

2.1. Stock mixtures

Stock mixtures containing approximately 10 µg/mg (1.0%) of each polymer were prepared. The exact weighed amounts are presented in Table 1.

Table 1: Polymer concentration of stock mixtures used in the current sample.

Polymer type	Total mass of polymer (mg)	Total mass of CaCO ₃ diluent (mg)	polymer content (µg/mg)	Polymer content (%)	Molecular weight (g/mol)
LDPE	49.8	5009.2	9.94	0.99	30k
HDPE	49.9	4996.6	9.99	1.00	80k
PP	51.1	4999.0	10.22	1.02	50k
PVC	50.3	5003.3	10.05	1.01	80k-120k
PET	48.9	5001.6	9.78	0.98	10k
PS	52.6	5003.2	10.51	1.05	150k-300k
PC	52.1	4992.9	10.43	1.04	30k-60k
ABS	47.6	4997.5	9.52	0.95	100k-200k
PMMA	47.7	4995.6	9.55	0.95	5k
PA6	51.5	5004.8	10.29	1.03	120k
PA6,6	50.1	5008.3	10.00	1.00	120k
PU	50.0	5000.1	10.00	1.00	4k (crosslinked)
TPU	49.4	4996.4	9.89	0.99	80k

2.2. Batch #Py-0001 [this sample]

Stock mixtures were diluted with CaCO₃ to achieve the desired polymer concentration of approximately 0.5 µg/mg. The exact amounts in Batch #Py-0001 (this sample) are presented in Table 2.



Table 2: Polymer concentration in Batch #Py-0001 (this sample). Note: Values under *Polymer content of stock mixture* refer to the composition before dilution with CaCO₃. In Batch #Py-0001, each polymer type was diluted to ~0.5 µg/mg (0.05% w/w of the sample). When combined, all polymers account for 6.52 µg/mg, corresponding to 0.65% of the total batch mass.

Polymer type or diluent	Total mass of stock mixture (mg)	Polymer content of stock mixture (µg/mg)	polymer content of stock mixture (%)	Polymer content of Batch #Py-0001 [this sample] (µg/mg)	Polymer content of Batch #Py-0001 (%)
CaCO ₃	349.7	N/A	N/A	N/A	N/A
LDPE	50.1	9.94	0.99	0.49	0.05
HDPE	49.8	9.99	1.00	0.50	0.05
PP	49.7	10.22	1.02	0.51	0.05
PVC	50.2	10.05	1.01	0.51	0.05
PET	51.1	9.78	0.98	0.50	0.05
PS	50.8	10.51	1.05	0.53	0.05
PC	49.9	10.43	1.04	0.52	0.05
ABS	50.2	9.52	0.95	0.48	0.05
PMMA	50.7	9.55	0.95	0.48	0.05
PA6	49.9	10.29	1.03	0.51	0.05
PA6,6	50.5	10.00	1.00	0.50	0.05
PU	50.3	10.00	1.00	0.50	0.05
TPU	50.6	9.89	0.99	0.50	0.05
Total	1003.5	N/A	N/A	6.52	0.65

The concentration of individual polymer types corresponds to 0.05% or ~0.5 µg/mg of sample. The concentration of all polymer types combined amounts to 0.65% of the total mass or 6.52 µg/mg of sample.



3. Disclaimer

The information given in this COA is correct to the best of our knowledge at the time of issue. Microplastic Solution (MPS) makes no warranties, express or implied, and assumes no liability in connection with the use of this product.

3.1. Support

That said, we are dedicated to helping researchers succeed. If you experience any issues with this material or require additional information, please reach out to us at contact@microplasticsolution.com. We are committed to supporting researchers in their micro- and nanoplastic analyses.

Approved by:

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