

# Application Note - The digestion of Polypropylene Plastic

## **Introduction:**

This study was performed to investigate the metal content in virgin and reground polypropylene plastic.

## **Sample Type:**

Polypropylene plastic (virgin and re-grind)

- Sample weight: 0.1 g
- 3 replicates each

## **Supplies and Reagent:**

- 1) **NOVAWAVE** Model SA Microwave Digestion System\*
- 2) Nitric Acid, **PlasmaPURE** HNO<sub>3</sub>, 70%\*
- 3) 75 ml quartz vessels\*
- 4) ICP-MS Elan 6100 from PerkinElmer
- 5) Scan 1-2-4 calibration standard (1, 10 and 1000 ppb)\*
- 6) Concentric nebulizer
- 7) Cyclonic baffled spray chamber\*

\*Manufactured by SCP SCIENCE.

## **Sample Preparation Procedure:**

A sample of 0.1 g was added to 10 ml of **PlasmaPURE** HNO<sub>3</sub>. The sample was digested following the temperature profile listed below. At the end of the digestion, the vessel was vented and normalized to 50 ml with DI water and analyzed on the ICP-MS. The results are given as an average of 3 replicates.

## **NOVAWAVE Heating Program:**

STAGE	RAMP TIME (Minutes)	PRESSURE (psi-limit)	TEMPERATURE (°C)	HOLD TIME (minutes)
1	10	435	180	10

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## Recoveries:

Element Symbol	Mass (amu)	Re-Grind (ppm)	Virgin (ppm)
Be	9	< DL	< DL
B	11	< DL	< DL
Na	23	9.62	7.18
Mg	24	11.23	10.37
Al	27	48.09	39.81
Si	28	153.01	153.11
K	39	9.17	7.13
Ca	44	27.94	29.66
Ti	47	1.73	1.45
V	51	< DL	< DL
Cr	52	4.33	4.44
Mn	55	0.08	0.061
Fe	57	< DL	< DL
Co	59	< DL	< DL
Ni	60	1.33	0.916

Element Symbol	Mass (amu)	Re-Grind (ppm)	Virgin (ppm)
Cu	63	0.43	0.321
Zn	66	2.23	1.678
As	75	< DL	< DL
Se	78	< DL	< DL
Sr	88	0.054	0.043
Mo	94	0.309	0.159
Ag	107	< DL	< DL
Cd	111	0.004	0.005
Sn	118	0.076	0.031
Sb	121	< DL	< DL
Ba	138	0.054	0.049
Tl	205	0.009	0.001
Hg	202	0.030	0.031
Pb	206	0.034	0.022

## Conclusions:

The re-grind material shows some elevated elements like Al, Zn and Mo. This might be contamination from the plastic grind machine. A digestion of a plastic CRM to evaluate the effectiveness of the *NOVAWAVE* is in progress.

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