

# Determination of Lead and Cadmium in Polypropylene Particles

### 1 Sample solution preparation:

About 0.1g sample (precision to one ten thousandth) was weighed and placed in a microwave digestion inner can, added with 5mL nitric acid and 1mL hydrogen peroxide, covered with lid, put into the outer can protective shell, held at 200 °C for 20 min. Upon cooling down, the inner can was taken out, the solution was transferred to a 50 mL colorimetric tube which was rinsed at least 3 times with deionized water, and made up to the volume, spared for later use.

Note: When using graphite furnace, ammonium dihydrogen phosphate was added as a matrix modifier, the ratio is 10  $\mu L$  sample to 5  $\mu L$  matrix modifier.

## 2 Experimental equipment and reagents:

Atomic absorption spectrophotometer (with Pb, Cd hollow cathode lamp, EWAI Inc.)

Microwave digester

Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>): excellent grade purity

Nitric acid (HNO<sub>3</sub>): excellent grade purity

Lead standard solution (National Reference Materials Research Center)

Cadmium standard solution (National Reference Materials Research Center)

#### 3 Instrument conditions

Element	Wavelength	Lamp current	D2 current	bandpass width	Background
	(λ/nm)	(I/mA)	(I/mA)	(Δλ/nm)	correction
Pb	283.3	3.0	80	0.2	D2 lamp
Cd	228.8	2.0	80	0.2	D2 lamp

#### Pb graphite furnace heating curve

No	Step	Start temp	End temp	Heating time (s)	Inner gas	Auxiliary gas	Mode
1	Drying	50	120	40	Open	Off	Power
2	Drying	120	120	15	Open	Off	Power



3	Ashing	120	900	10	Open	Off	Power
4	Ashing	900	900	8	Open	Off	Power
5	Ashing	900	900	6	Off	Off	Power
6	Atomization	2000	2000	3	Off	Off	Power
7	Cleaning	2200	2200	3	Open	Off	Power
8	Cooling	0	0	22	Open	Off	Power
9	Cooling	0	0	1	Off	Off	Power

## Cd graphite furnace heating curve

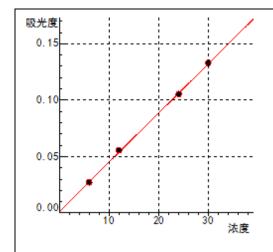
Step	End temp	Slope time	Hold time (	Gas type	Reading	Signal Display
	(s)	(s)				
1	40°	1.0	2.0	2nd	Off	Off
2	Add sample					
3	70°	10.0	10.0	2nd	Off	Open
4	110°	15.0	10.0	2nd	Off	Open
5	600°	10.0	5.0	2nd	Off	Open
6	600°	0.0	1.0	No	Off	Open
7	1800°	1.2	0.5	No	Open	Open
8	2000°	1.0	1.0	2nd	Off	Open

# 4 Standard solution preparation

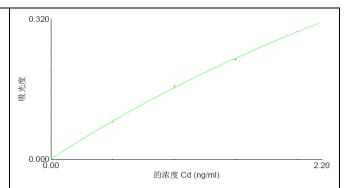
Element			Conc	centration (µ	ıg/L)	
Pb	0	6	12	24	30	
Cd	0	0.5	1	1.5	2	



## 5 Standard curve



 $\begin{array}{l} Pb \ linearity \ coefficient \colon \ 0.99970 \\ curve \ equation \colon \ Y{=}0.00436*X{+}0.00160 \end{array}$ 



Cd Concentration least squares maximum error : 0.0257 R2: 0.9990 R : 0.9995

Conc = Abs / (0.1847 + -0.1359 \* Abs)