

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 μ L sample to 5 μ L matrix modifier.

2 Experimental equipment and reagents :

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

Microwave digester

Hydrogen peroxide (H₂O₂): excellent grade purity

Nitric acid (HNO₃): excellent grade purity

Lead standard solution (National Reference Materials Research Center)

Cadmium standard solution (National Reference Materials Research Center)

3 Instrument conditions

Element	Wavelength (λ /nm)	Lamp current (I/mA)	D2 current (I/mA)	bandpass width ($\Delta\lambda$ /nm)	Background 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 (s)	Slope time (s)	Hold time	Gas type	Reading	Signal Display
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	Concentration (µg/L)				
Pb	0	6	12	24	30
Cd	0	0.5	1	1.5	2

5 Standard curve

