

## Determination of Zn, Mg, Co and Al Content in Rubber

### 1 Sample solution preparation :

0.15g sample (precision to 0.0001g) was accurately weighed in a high-neck beaker, added with 4mL sulfuric acid, covered with lid, placed and heated on a hot plate to digest. As the white smoke stops, it was removed to cool down, 10mL nitric acid was added, covered with lid and continue to digest until the solution becomes clear and transparent (if the solution is not clear, 5 mL nitric acid can be added to continue digestion). As the solution is concentrated to about 3 mL in volume, 10mL (1+2) hydrochloric acid was added, heated to dissolve salt, then removed to cool down to room temperature. Then it was transferred to a 100 mL volumetric flask and made up to the volume with (1+2) hydrochloric acid, shaken well. Blank reagent was prepared simultaneously.

### 2 Experimental equipment and reagents :

AA7000 series atomic absorption spectrophotometer (with Zn, Mg, Co, Al hollow cathode lamp, EWAI Inc.)

Temperature-controlled hot plate

Sulfuric acid (H<sub>2</sub>SO<sub>4</sub>): excellent grade purity

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

Hydrochloric acid (HCl): excellent grade purity

100g/L lanthanum chloride solution: 11.73g lanthanum oxide was weighed and placed in a 100mL volumetric flask, first wet with small amount of water and then 37.5mL hydrochloric acid was added. Added with deionized water to dilute up to the volume.

Zinc standard solution (National Reference Materials Research Center)

Magnesium standard solution (National Reference Materials Research Center)

Cobalt standard solution (National Reference Materials Research Center)

Aluminium standard solution (National Reference Materials Research Center)

### 3 Instrument conditions

Parameter	Wavelength (nm)	Slit width (nm)	Burner height (mm)	Fuel gas flow rate (L/min)	Lamp current (mA)	Flame type
Zn	213.9	0.2	10	1.5	5	Air - acetylene
Mg	285.2	0.2	10	1.5	2	Air - acetylene



Co	240.7	0.2	10	1.5	3	Air – acetylene
Al	309.3	0.2	8	3	3	Nitrous oxide - acetylene

#### 4 Standard solution preparation

For each 100mL Mg standard solution, 1.5 mL 100 g/L lanthanum chloride solution is to be added.

Element	Concentration (μg/mL)					
Zn	0	0.1	0.2	0.3	0.5	
Mg	0	0.1	0.2	0.4	0.6	
Co	0	0.25	0.5	1.0	1.5	
Al	0	1.0	3.0	5.0	9.0	

#### 5 Standard curve

When measuring Mg sample solution, the concentration of lanthanum chloride should be the same as that in the standard solution.



