

VA Application Note No. V - 114

Title: Cobalt in PET (polyethylene terephthalate)

Summary: Co is determined in polyethylene terephthalate (PET) after digestion in sulfuric acid and hydrogen peroxide. The application is carried out with adsorptive stripping voltammetry (AdSV) in ammonia buffer with dimethylglyoxime (DMG) as complexing agent.

Sample: PET pellets

Sample preparation: 250 mg sample
2 mL w(H₂SO₄) = 96 % suprapur
are put into a flask of the digestion apparatus and heated to 250°C.
1 mL (H₂O₂) = 30% suprapur is added through a dropping funnel. The mixture reacts intensively. Another 1 mL H₂O₂ is added. After the 2nd addition the mixture was heated to 400° C until SO₃ fumes are formed. After cooling down the solution was filled up to 100 mL.

Analysis of Co

Electrolyte ammonia buffer:
c(HCl) = 1 mol/L + c(NH₃) = 3 mol/L
DMG solution:
c(dimethylglyoxime disodium salt) = 0.1 mol/L in water

Measuring solution 10 mL water
+ 500 µL digestion solution
+ 100 µL DMG solution
+ 0.5 mL ammonia buffer
The pH is adjusted to 8.5 - 9 with w(NH₃) = 10% suprapur.

Auxiliary electrode (AE) Pt

Reference electrode (RE) Ag/AgCl/KCl (3 mol/L)

Parameters	Working electrode	HMDE
	Stirrer speed	2000 rpm
	Mode	DP
	Purge time	300 s
	Deposition potential	-700 mV
	Deposition time	30 s
	Equilibration time	5 s
	Pulse amplitude	50 mV
	Start potential	-900 mV
	End potential	-1250 mV
	Voltage step	6 mV
	Voltage step time	0.1 s
	Sweep rate	60 mV/s
	Peak potential Co	-1050 mV

Results:	Co
	45 µg/g

Determination of Co

