VA Application Note No. V - 190

Title:	**Mercury in polymer materials as part of electrotechnical products**

Summary:	The EU directive on «Restriction of Hazardous Substances» (RoHS) requires the testing of four regulated heavy metals (Pb, Hg, Cd, Cr(VI)) in electrotechnical products. After sample preparation according to IEC 62321 the determination of mercury in polymer materials can be carried out by anodic stripping voltammetry (ASV) at a gold rotating disk electrode (Au-RDE).

Sample:	Polymer materials
Sample preparation:	Approx. 0.1 g of sample is mineralized by microwave digestion with a mixture of nitric acid, fluoroboric acid and hydrogen peroxide as described in IEC 62321.

Analysis of Hg

Electrolyte

Perchloric acid electrolyte
$c(HClO_4)$ = 0.22 mol/L
c(EDTA) = 4 mmol/L
c(NaCl) = 6 mmol/L

Measuring solution

10 mL ultrapure water
+ 10 mL perchloric acid electrolyte
+ 0.05 mL digested sample solution
(equals approx. 0.2 mg of sample)

Working electrode (WE)

Au-RDE

Gold electrode tip	6.1204.140
Driving axle	6.1204.210

Auxiliary electrode (AE)

GC

Glassy carbon rod	6.1247.000
Electrode holder	6.1241.020

Reference electrode (RE)

Reference system: Ag/AgCl/KCl (3 mol/L)	6.0728.020
Intermediate electrolyte: ***c(NaCl) = 3 mol/L***	6.1245.010

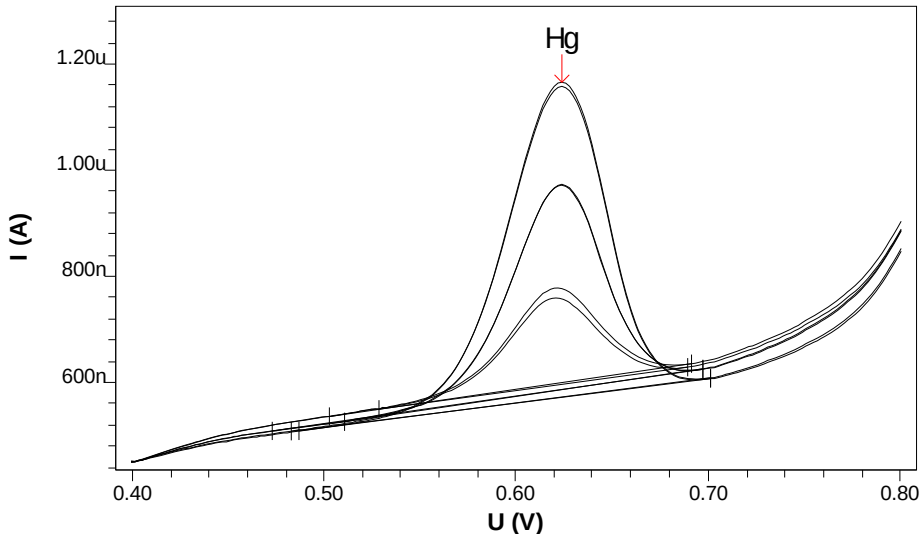
Parameters

Working electrode	RDE
Stirrer speed	2000 rpm
Mode	DP
Purge time	300 s
Cleaning potential	+1.3 V
Cleaning time	30 s

	Deposition potential	+0.37 V
	Deposition time	30 s
	Equilibration time	10 s
	Pulse amplitude	0.05 V
	Start potential	+0.4 V
	End potential	+0.8 V
	Voltage step	0.002 V
	Voltage step time	0.1 s
	Sweep rate	0.02 V/s
	Peak potential Hg	+0.64 V

Results:	Hg
	1014.0 mg/kg

Determination of Hg



Hg
c = 1013.997 mg/kg
+/- 50.683 mg/kg (5.00%)