VA Application Note No. V - 192

Title:	**Chromium(VI) in chromate coating on metallic 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 chromium(VI) in chromate coating on metallic materials can be carried out by adsorptive stripping voltammetry (AdSV) using DTPA (diethylenetriamine pentaacetic acid) as complexing agent.

Sample:	Colorless and colored chromate coating on metallic materials
Sample preparation:	Boiling-water-extraction on a total surface area of 50 ± 5 cm^2 as described in IEC 62321.

Analysis of Cr(VI)

Electrolyte

DTPA electrolyte
c(sodium acetate) = 0.2 mol/L
c(DTPA) = 0.05 mol/L
c($NaNO_3$) = 2.5 mol/L
pH 6.20 ± 0.1 adjusted

Measuring solution

10 mL ultrapure water
+ 2 mL DTPA electrolyte
+ 0.25 mL extraction solution

Working electrode (WE)	**MME** (Multi Mode Electrode)	6.1246.020
	With silanized capillary	6.1226.050
Auxiliary electrode (AE)	**Pt**	6.0343.000
Reference electrode (RE)	Reference system: Ag/AgCl/KCl (3 mol/L)	6.0728.020
	Intermediate electrolyte: c(KCl) = 3 mol/L	6.1245.010

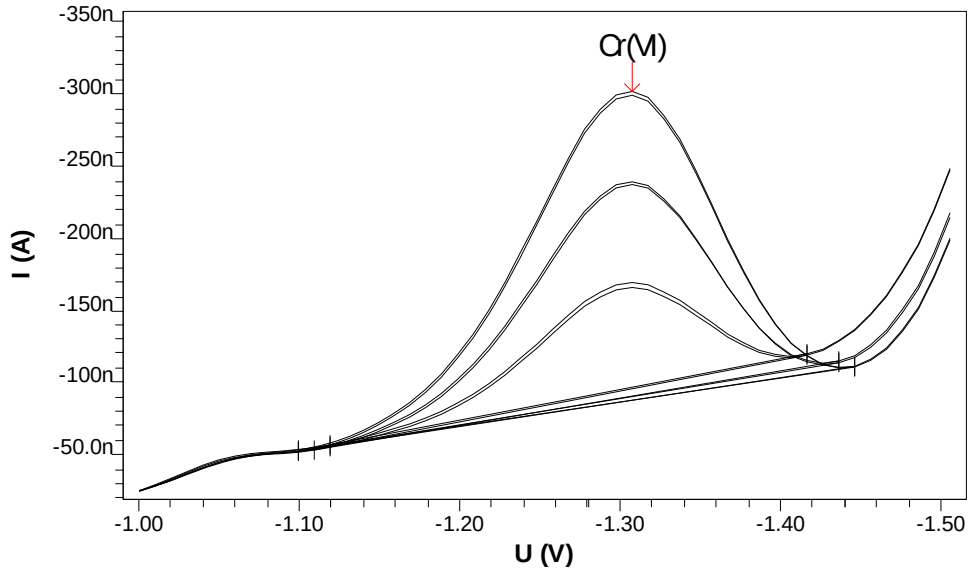
Parameters

Working electrode	HMDE
Stirrer speed	2000 rpm
Mode	DP
Purge time	300 s
Deposition potential	-0.9 V
Deposition time	30 s
Equilibration time	10 s

	Pulse amplitude	0.05 V
	Start potential	-1.0 V
	End potential	-1.5 V
	Voltage step	0.01 V
	Voltage step time	0.3 s
	Sweep rate	0.033 V/s
	Peak potential Cr(VI)	-1.3 V

Results:	Cr(VI)
	0.020 mg/kg

Determination of Cr(VI)

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Cr(VI)
c =     0.020 mg/kg
+/-     0.001 mg/kg (3.86%)
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