

VA Application Note No. V - 149

Title: Cobalt in a sulfamate nickel plating bath

Summary: The concentration of Co in a sulfamate Ni plating bath is determined by adsorptive stripping voltammetry (AdSV) in ammonia buffer pH 9.6 with dimethylglyoxime (DMG) as complexing agent. All reagents have to be added in the order listed below. Special care has to be taken that the measuring solution is mixed well before the complexing agent is added. In case of precipitations of Ni-DMG further dilution of the sample is necessary.

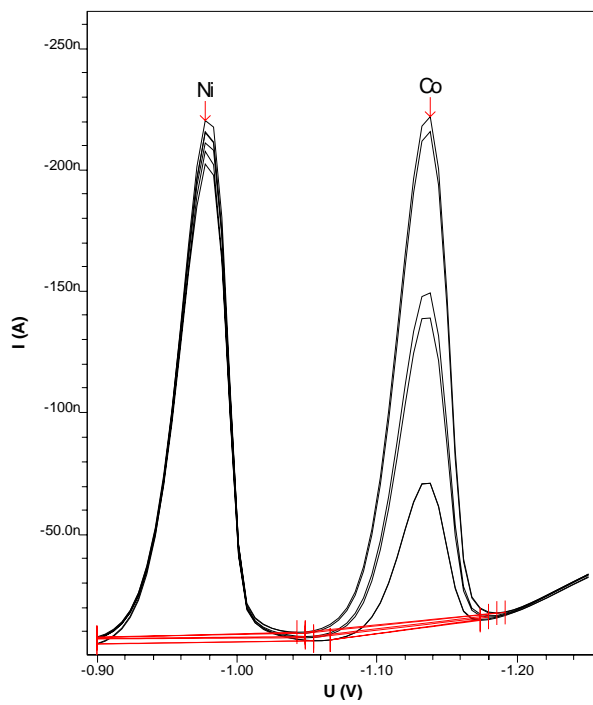
Sample: Sulfamate nickel electroplating bath
Sample preparation: Dilution 1:1000

Analysis of Co		
Ammonia buffer pH 9.6	c(HCl) = 1 mol/L c(NH ₃) = 3 mol/L	
DMG solution	c(dimethylglyoxime disodium salt) = 0.1 mol/L in water	
Measuring solution	10 mL ultrapure water + 1 mL ammonia buffer pH 9.6 + 10 µL diluted nickel bath mix well + 100 µL DMG solution	
Working electrode (WE)	MME (Multi Mode Electrode) 6.1246.020	
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	-1.0 V
	Deposition time	30 s
	Equilibration time	10 s
	Pulse amplitude	0.05 V
	Start potential	-0.9 V
	End potential	-1.25 V
	Voltage step	0.004 V

Voltage step time	0.1 s
Sweep rate	0.04 V/s
Peak potential Co	-1.15 V

Result:	Co
	2 g/L

Determination of Co



Co
 c = 2.048 g/L
 +/- 0.052 g/L (2.54%)

