VA Application Note No. V - 170

Title:	**Selenium(IV) in zinc plant electrolyte**

Summary:	The concentration of Se(IV) in zinc plant electrolyte is determined by cathodic stripping voltammetry (CSV) in ammonium sulfate electrolyte containing EDTA and Cu. The Cu concentration has to be adapted to the sample and the deposition time. With voltammetry only free selenium is determined, therefore it has to be taken into consideration that selenium forms sparingly soluble compounds with numerous cations (e.g. $Fe_2(SeO_3)_3$ with $K_s = 2 \cdot 10^{-31}$).

Sample:	Zinc plant electrolyte (concentrated $ZnSO_4$ solution)
Sample preparation:	None

Analysis of Se(IV)

Supporting electrolyte	$c((NH_4)_2SO_4)$ = 2.5 mol/L	
EDTA solution	$c(Na_2EDTA)$ = 0.1 mol/L *Na_2EDTA: Ethylenediaminetetraacetic acid disodium salt*	
Cu solution	β(Cu) = 1 g/L	
Measuring solution	10 mL supporting electrolyte + 1 mL EDTA solution + 0.2 mL Cu solution + 20 µL zinc plant electrolyte pH 2.2 adjusted with H_2SO_4	
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) Intermediate electrolyte: c(KCl) = 3 mol/L	6.0728.020 6.1245.010

Parameters

Working electrode	HMDE
Stirrer speed	2000 rpm
Mode	DP
Purge time	300 s
Deposition potential	-0.4 V
Deposition time	120 s
Equilibration time	10 s
Pulse amplitude	**0.08 V**

	Start potential	-0.4 V
	End potential	-0.95 V
	Voltage step	0.004 V
	Voltage step time	0.1 s
	Sweep rate	0.04 V/s
	Peak potential Se	-0.73 V

Results:	Se
	129.1 µg/L

Determination of Se