

VA Application Note No. V - 178

Title: Determination of copper in sea water with the mercury film electrode (MFE)

Summary: The concentration of Cu in sea water is determined by anodic stripping voltammetry (ASV) in acetate buffer on a mercury film electrode (MFE). Gallium is added to overcome zinc interferences.

Sample: Sea water
Sample preparation: None

Analysis of Cu																											
Acetate buffer pH 4.6	c(CH ₃ COONH ₄) = 1 mol/L c(CH ₃ COOH) = 1 mol/L																										
Mercury solution	β(Hg ²⁺) = 1 g/L																										
Gallium solution	β(Ga ³⁺) = 10 mg/L																										
Measuring solution	7.5 mL sea water + 2 mL acetate buffer pH 4.6 + 0.2 mL mercury solution + 0.05 mL gallium solution																										
Working electrode (WE)	UT-RDE:																										
	drive shaft	6.1246.000																									
	Ultra trace graphite electrode	6.1204.180																									
Auxiliary electrode (AE)	GC																										
	electrode holder	6.1241.020																									
	glassy carbon rod	6.1247.000																									
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	<table border="1"> <tbody> <tr> <td>Working electrode</td> <td colspan="2">RDE</td> </tr> <tr> <td>Stirrer speed</td> <td colspan="2">2000 rpm</td> </tr> <tr> <td>Mode</td> <td colspan="2">DP</td> </tr> <tr> <td>Purge time</td> <td colspan="2">300 s</td> </tr> <tr> <td rowspan="3">Conditioning Cycles</td> <td>Start potential</td> <td>-0.5 V</td> </tr> <tr> <td>End potential</td> <td>-0.1 V</td> </tr> <tr> <td>No. of cycles</td> <td>50</td> </tr> <tr> <td>Cleaning potential</td> <td colspan="2">-0.15 V</td> </tr> <tr> <td>Cleaning time</td> <td colspan="2">20 s</td> </tr> </tbody> </table>		Working electrode	RDE		Stirrer speed	2000 rpm		Mode	DP		Purge time	300 s		Conditioning Cycles	Start potential	-0.5 V	End potential	-0.1 V	No. of cycles	50	Cleaning potential	-0.15 V		Cleaning time	20 s	
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Deposition potential	-0.8 V
Deposition time	75 s
Equilibration time	10 s
Pulse amplitude	0.05 V
Start potential	-0.6 V
End potential	-0.1 V
Voltage step	0.006 V
Voltage step time	0.1 s
Sweep rate	0.06 V/s
Peak potential Cu	-0.28 V

Results:	Cu
	15.6 µg/L

Determination of Cu

