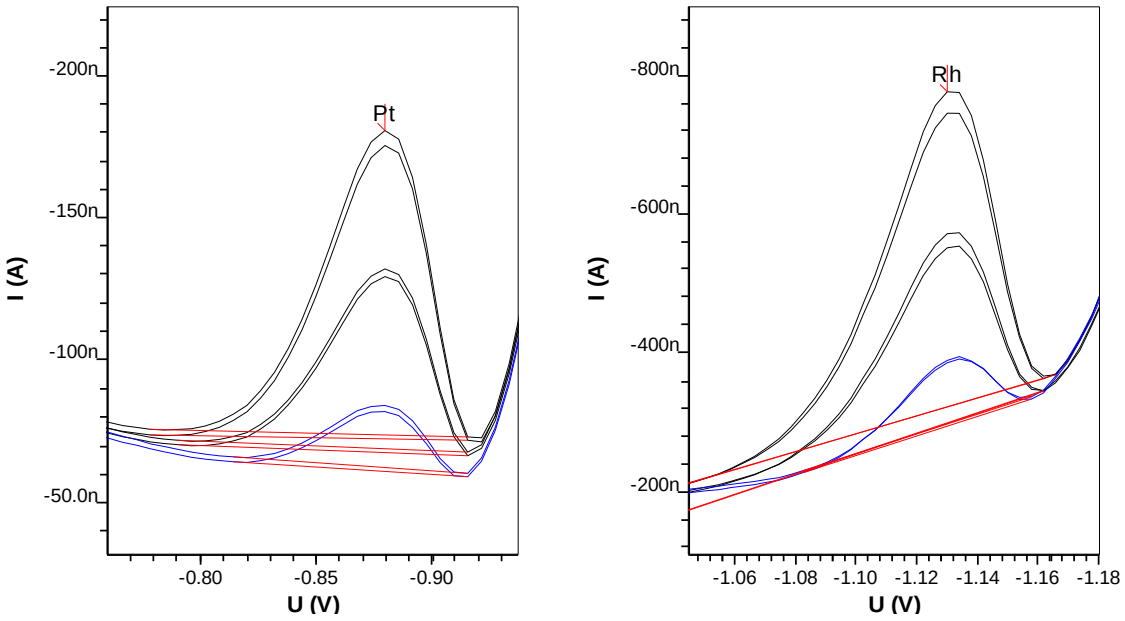
VA Application Note V–94

Platinum and rhodium in red wine after UV digestion



For the determination of heavy metals in wine, UV digestion is required to mineralize the sample. The determination of platinum and rhodium is carried out with adsorptive stripping voltammetry (AdSV) at the HMDE.

Results

Pt	5.1 ng/L
Rh	10.5 ng/L

Metrohm

Method description

Sample

Red wine

Instruments

797 VA Computrace & 909 UV Digester

Sample preparation

1 mL red wine, 10 µL HCl (w(HCl) = 30%*), 2 mL ultrapure water, and 2 mL H_2O_2 w(H_2O_2)= 30%* are pipetted into the 12 mL quartz sample vessels. The sample holder with the 12 quartz sample vessels is placed in the 909 UV Digester and irradiated at 90 °C for 2 h. After 1 h another 0.5 mL H_2O_2 (w(H_2O_2)= 30%*) are added.

*for trace analysis, e.g., Merck suprapur®, Sigma-Aldrich TraceSelect® or equivalent.

Parameters 909 UV Digester

Temperature	90 °C
Irradiation time	60 min

Electrodes

Multi-Mode Electrode pro Silanized capillaries	6.1246.120 6.1226.050
Ag/AgCl/KCl (3 mol/L) reference electrode. Bridge electrolyte c(KCl) = 3 mol/L.	6.0728.020 6.1245.010
Glassy carbon rod Electrode holder	6.1247.000 6.1241.020

Solutions

Electrolyte Rh	Diluted formaldehyde solution, w(HCHO) = 18.5% 1 mL w(formaldehyde) = 37% is diluted with 1 mL ultrapure water
Electrolyte Pt	Hydrazine sulfate solution, c($N_2H_6SO_4$) = 0.05 mol/L 0.13 g Hydrazine sulfate are dissolved in 20 mL ultrapure water.
Sulfuric acid	c(H_2SO_4) = 2 mol/L

Analysis

Measuring solution Rh	The digested sample solution was rinsed with 1 mL H_2O into measuring vessel. After addition of 100 µL HCl (w(HCl) = 30%*) and 10 µL diluted formaldehyde solution Rh was determined.
Measuring solution Pt	15 µL hydrazine sulfate solution were added to the Rh measurement solution and stirred for 60 s. After addition of 0.34 mL sulfuric acid Pt was determined.

Parameters 797 VA Computrace

Analysis of Rh

Working electrode	HMDE
Stirrer speed	2000 rpm
Mode	DP
Purge time	300 s
Deposition potential	-0.7 V
Deposition time	60 s
Equilibration time	10 s
Start potential	-0.9 V
End potential	-1.23 V
Pulse amplitude	0.05 V
Voltage step	0.004 V
Voltage step time	0.3 s
Sweep rate	0.0133 V/s
Peak potential Rh	-1.17 V

Analysis of Pt

Working electrode	HMDE
Stirrer speed	2000 rpm
Mode	DP
Purge time	60 s (300 s if only Pt is determined)
Deposition potential	-0.7 V
Deposition time	90 s
Equilibration time	10 s
Start potential	-0.6 V
End potential	-1.0 V
Pulse amplitude	0.05 V
Voltage step	0.006 V
Voltage step time	0.3 s
Sweep rate	0.02 V/s
Peak potential Pt	-0.88 V

Metrohm