



#### VA APPLICATION NOTE V-209

# Carbonyl test methods for alcohols

## Simultaneous determination of acetaldehyde, acetone, formaldehyde, and propionaldehyde with the Multi-Mode Electrode pro

Determination of carbonyl impurities, such as aldehydes and ketones, in alcoholic organic solvents is essential for ensuring product quality and stability.

This Application Note describes a polarographic method that employs the Multi-Mode Electrode pro for the simultaneous determination of different carbonyl compounds in alcohols. It offers a simple and sensitive tool for industries requiring rigorous alcohol quality control.

This technique involves the formation of hydrazone derivatives through the reaction of carbonyl compounds with hydrazine sulfate. Its advantage lies in its multi-analyte determination, detection of low-concentration carbonyl compounds and applicability to a broad range of alcohols, e.g., methanol or propanol, enabling precise quality assessments.

## SAMPLE

Methanol

Isopropanol

## EXPERIMENTAL

Add ultrapure water, the sample, and electrolyte solution into the measuring vessel and degas it for 5 min. Determination is carried out with the 884 Professional VA manual for MME (Figure 1) using parameters listed in Table 1. Quantification is done using two standard additions with respective standard addition solutions.



Figure 1. 884 Professional VA manual for MME

Table 1. Parameters

Parameter	Setting
Mode	DME
Start potential	-0.8 V
End potential	-1.6 V
Sweep rate	20 mV/s
Peak potential acetaldehyde	-1.22 V
Peak potential formaldehyde	-1.08 V
Peak potential acetone	-1.38 V
Peak potential propionaldehyde	-1.22 V

## ELECTRODES

- Multi-Mode Electrode pro

## RESULTS

Figure 2 shows the results of formaldehyde, acetaldehyde, and acetone determination in methanol. Figure 3 shows the results of propionaldehyde and acetone determination in isopropanol.

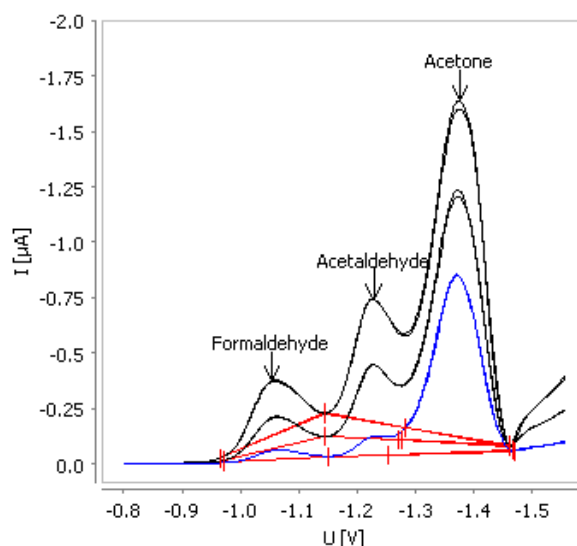


Figure 2. Determination of formaldehyde, acetaldehyde, and acetone in methanol

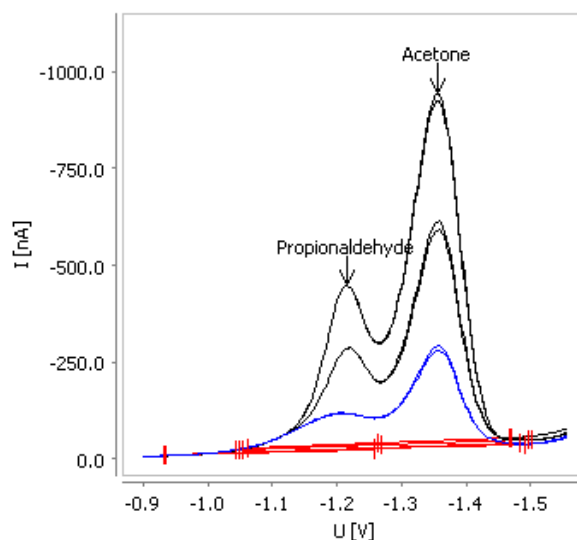


Figure 3. Determination of propionaldehyde and acetone in isopropanol

**Table 2.** Result

Analyte	Methanol	Isopropanol
β(Formaldehyde) mg/L	8.22	-
β(Acetaldehyde ) mg/L	7.08	-
β(Propionaldehyde) mg/L	-	5.95
β(Acetone) mg/L	45.21	4.02

**Analytes:** Aldehydes, ketones  
**Matrix:** Solvents  
**Method:** Voltammetry,  
Polarography  
**Industry:** Chemical