

Application Note AN-V-061

Iron speciation in water with the Multi-Mode Electrode pro

Simultaneous determination of Fe(II) and Fe(III) in mg/L concentration levels

Various industries depend on knowing the exact concentrations of different iron species in their water. Traditional analytical methods often have difficulty to accurately distinguish between Fe(II) and Fe(III) because they have similar chemical properties. This leads to errors and incorrect data, hindering advancements in critical fields like energy generation/storage and research into chemical or electrochemical processes. Cathodic sweeping voltammetry (CSV)

overcomes these challenges and offers a robust, cost-effective, and convenient alternative to other techniques. Its ability to distinguish between ferrous and ferric iron is unparalleled. This improved accuracy enables scientists to make significant steps in technological research and industrial efficiency. In this Application Note, the Multi-Mode Electrode pro is used to simultaneously determine Fe(II) and Fe(III) in water.

SAMPLE

Check standard solutions

EXPERIMENTAL

Add the water sample to a vessel filled with degassed electrolyte. Use two standard additions with separate Fe(II) and Fe(III) standard solutions to perform the quantification.



Figure 1. 884 Professional VA manual for MME.

Table 1. Parameters

Parameter	Setting
Mode	DME
Start potential	0.0 V
End potential	-1.5 V
Sweep rate	30 mV/s
Peak potential Fe(II)	-0.25 V
Peak potential Fe(III)	-0.8 V

ELECTRODES

- Multi-Mode Electrode pro

RESULTS

The voltammogram shown in **Figure 2** illustrates the successful determination of Fe(II) and Fe(III) species in a solution containing 0.5 mg/L of each. The clear resolution of the two peaks demonstrates the capability of the method to differentiate and quantify Fe(II) and Fe(III) in a mixed solution.

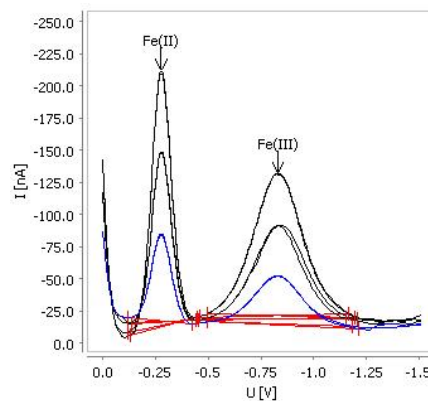


Figure 2. Results of iron speciation determination in a check standard solution by CSV.

Table 2. Result

Sample	Fe(II) (mg/L)	Fe(III) (mg/L)
Check standard solution	0.507	0.516

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CONFIGURATION



(MME) 884 Professional VA manual

用于多模式 (MME) 的 884 Professional VA manual 是借助多模式 pro 或 scTRACE Gold 或液滴使用伏安法和法行高端痕量分析的入器。此已的瑞士万通技与高效位/恒位以及外接的活 viva 件用,在重金属定域中展了新的前景。有的校准器的恒位在每次量之前均自冲洗行校准,保可能的最高精度。

通此器也可使用旋行定,例如借助«循伏安溶出法»(CVS)、«循脉冲伏安溶出法»(CPVS)和位法(CP)定池中的有机添加。借助可更的量,可在使用不同的各用之快速切。

使用 viva 件行控制、数据采集和估。

用于 MME(多模式)的 884 Professional VA manual 供配大量附件,包括用于多模式 pro 的量。和 viva 可独。