Application Note AN-V-197

Indirect determination of iodide in brine with stripping voltammetry

Quantification of iodide in the chlor-alkali process through iodate formation with the hanging mercury drop electrode

Monitoring the iodide concentration in NaCl brine is crucial during membrane process-based chlor-alkali electrolysis. Iodide can easily oxidize to iodate during electrolysis, leading to its precipitation and fouling of the membrane surface. Fouling can reduce the high efficiency of the membrane process and lead to increased energy consumption and decreased product quality. Therefore, monitoring the iodide concentration can help prevent fouling and protect the expensive membranes used in this process.

Stripping voltammetry, with its low detection limit and quick analysis capabilities, emerges as an attractive tool for the analysis of iodide in highly concentrated brines. By utilizing voltammetry, chlor-alkali plants can effectively monitor and manage iodide levels, thus preventing membrane fouling. This approach not only preserves membrane durability and function but also results in high performance of the electrolysis process.

SAMPLE

Sodium chloride brine, β(NaCl) = 300 g/L

EXPERIMENTAL

Add 10 mL oxidized sodium chloride brine sample and 2 mL of ultrapure water into the measuring vessel. The determination of iodide is carried out with the 884 Professional VA (**Figure 1**) using the parameters specified in **Table 1**. The concentration is determined by two additions of iodate standard addition solution.

Figure 1. 884 Professional VA manual for MME.

Table 1. Parameters

Parameter	Setting
Mode	HMDE
Start potential	-0.7 V
End potential	-1.3 V
Sweep rate	13 mV/s
Peak potential iodide	-1.05 V

ELECTRODES

- Multi-Mode Electrode pro

RESULTS

The chlor-alkali brine solution contains a high concentration of chloride ions that can interfere with the direct measurement of iodide. By converting iodide to iodate, these interferences are minimized. The determined iodate concentration is then recalculated as iodide concentration as indicated in Table 2.

The method is suitable for the determination of low concentrations of iodide in sodium chloride brine (β(NaCl) = 300 g/L) samples.

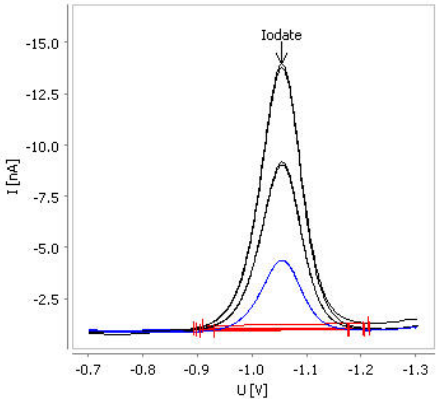

Figure 2. Determination of iodate in sodium chloride brine with stripping voltammetry.

Table 2. Result

Sample	Iodate (µg/L)
Sodium chloride brine	72.86

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Sample	Iodate (µg/L)
Sodium chloride brine	72.86
Sample	Iodide (µg/L)
Sodium chloride brine	52.63

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CONFIGURATION

(MME) 884 Professional VA manual

用于多模式电极 (MME) 的 884 Professional VA manual 是借助多模式电极 pro 或 scTRACE Gold 或铋液滴电极使用伏安法和极谱法进行痕量分析的入门仪器。此项已经证实的瑞士万通电极技术与恒电位/恒电位仪以及外接的灵活 viva 软件联用,在重金属测定领域中展现了新的前景。带有经认证的校准器的恒电位仪在每次测量之前均自动冲洗进行校准,确保可能的高精度。

通过此仪器也可使用旋转圆盘电极进行测定,例如借助«循环伏安溶出法»(CVS)、«循环脉冲伏安溶出法»(CPVS)和计时电位法(CP)测定电镀池中的有机添加剂。借助可更换的测量头,可在使用不同电极的各种应用之间实现快速切换。

使用 viva 软件进行控制、数据采集和评估。

用于 MME(多模式电极)的 884 Professional VA manual 供货时配备大量附件,包括用于多模式电极 pro 的测量头。电极组和 viva 许可证则须单独订购。