

Varajane

pH and Potentiometric Analysis: Theory and Practice

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Introduction

The first practical glass electrode for pH measurement was introduced in 1909. A vast amount of technical literature has been written in the ninety years since, and highly sophisticated pH meters developed to facilitate the potentiometric determination of pH using the pH sensitive glass electrode.

This paper is written for laboratory technicians, plant operators, and laboratory managers to provide a fundamental understanding of pH and its determination using modern pH electrodes and pH meters. This will not be an arduous study, and so will not discuss Arrhenius theory, activity coefficients, the Debye-Hückel equation, the Helmholtz bi-layer, and other more technical aspects of pH theory and measurement.

What we will cover is the basics, and hopefully demystify the subject so the technician will have a better understanding of what is going on inside 'the black box'. In addition, we will touch on some practical aspects of conducting a pH measurement: 1) how to reduce sources of error; 2) how to obtain a good calibration; 3) how to properly condition electrodes; and 4) how to obtain correct average pH values from multiple analyses. A bibliography is included for those who desire a more rigorous study of the material.