Phosphate measurements, which are of considerable importance in many environmental applications, control the amount of phosphorus supplied to crops as fertilizer. Clinical diagnosis of hyperparathyroidism, vitamin D deficiency, and Fanconi syndrome, based on specific phosphate concentrations (such as urine or serum), is also highly critical. Cobalt as phosphate ion-selective sensor materials should first present the surface of the cobalt in deionized water, and that the metal surface of cobalt oxide. The cobalt-based phosphate ion-selective sensor respond to all three forms of phosphate ions, namely, \( \text{H}_2\text{PO}_4^- \), \( \text{HPO}_4^{2-} \), and \( \text{PO}_4^{3-} \). This research focused on development and evaluation techniques. The calibration curve at pH 8.0 had a slope of 33.1 mV and a R² value of 0.98. Other characteristics of this phosphate ion-selective sensor include detection limit, response time, corrosion, life time, interference with pH, ions and dissolved oxygen (DO). The phosphate ion-selective sensor is a highly useful tool for \textit{in situ} measurement of phosphate and in everyday applications involving environmental pollution and medicine.

![Fig. 1. Calibration of the phosphate sensor](image1)

![Fig. 2. Evaluation of the response time of the phosphate sensor](image2)

![Fig. 3. Evaluation of the detection range of the sensor](image3)

![Fig. 4. The phosphate sensor phosphate was immersed in \(10^{-4}\) M KH\(_2\)PO\(_4\) solution](image4)
Ionic strength interference

Fig. 5. Evaluation of the lifetime of the sensor.

Fig. 6. Evaluation of the effect of pH-7.5, phosphate pH-8, and pH-8.5 on the phosphate sensor.

Fig. 8. Evaluation of the selectivity of the phosphate sensor against major anions: (a) chlorine ion; (b) sulfate ion; (c) acetate ion; and (d) nitrate


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