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Supporting Information

Development of Nickel oxide/oxyhydroxide-modified printed carbon electrode as an all solid-state sensor for potentiometric phosphate detection

Sotoudeh Sedaghat[1,2], Sookyoung Jeong [1,2], Amin Zareei [1,2], Samuel Peana [3], Nicholas Glassmaker[1], Rahim Rahimi*[1,2]

[1] Birck Nanotechnology Center, Purdue University, West Lafayette, IN, 47907, USA

[2] School of Materials Engineering, Purdue University, West Lafayette, IN, 47907, USA

[3] School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN, 47907, USA

Table S1. Comparison of sensitivity parameters for phosphate detection on NiO/NiOOH-PrC electrodes prepared using different electrodeposition durations.

Electrodeposition time (min)	Sensitivity (mV/decade)	Calibration curve Linearity (R-square)	Output Range (mV)
30	6.94	58.82	59.6
60	78.48	99.06	455.6
90	103.14	77.48	520.9
120	46.34	58.72	283.3
180	62.99	83.03	386.7

Table S1 compares the sensitivity, linearity (R-square factor) and output quantitative data for obtained NiO/NiOOH-PrC electrodes in different NiO electrodeposition duration. This table information is plotted and described in **Fig. 6** in the manuscript file, section 3.2. The data reveal that the electrode which was prepared by 60 minutes of electrodeposition is optimal sensor toward phosphate detection.

Table S2. Long-term detection data obtained for phosphate detection on prepared NiO/NiOOH-PrC electrode.

Time (day)	Sensitivity (mV/decade)	Calibration curve linearity (R-square)	Response percentage compared to initial measurement (%)	Sensitivity difference vs. initial measurement (mV/decade)	Sensitivity change Percentage (%)
1	78.86	0.99	100	-	-
7	77.96	0.97	98.86	0.89	1.15
14	77.04	0.91	97.69	1.82	2.36
21	76.97	0.94	97.60	1.89	2.46

Table S2 shows the collected data for long-term efficiency change of NiO/NiOOH-PrC electrode in phosphate detection studied for 21 days. The data also provided as calibration curve in **Fig. 7b** in the manuscript file, section 3.3. According to these results, NiO/NiOOH-PrC electrode shows high stability toward drying and reusing with small changes in phospahate detection parameters. After 4 measurements performed over 21 days, the sensitivity variation compared to the first measurement was 1.89 mV. This sensor can be stored in ambient condition and does not need any treatment prior to each test.

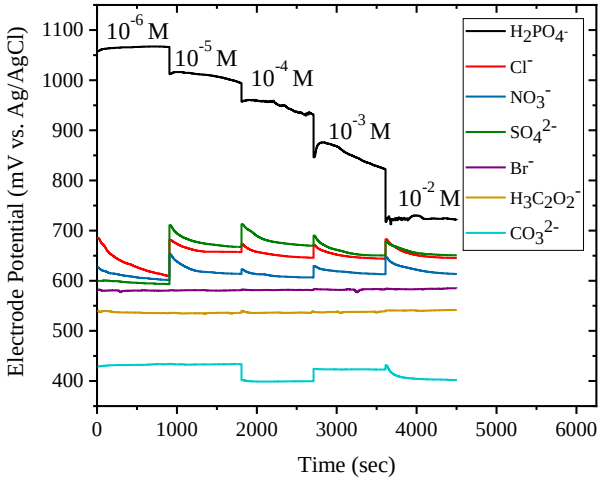

Fig. S1. Chronopotentiometric data for potential change on NiO/NiOOH-PrC electrode by successive addition of phosphate or interfering ions.

Fig. S1 exhibits the chronopotentiometric data for phosphate and all studied possible interfering ions to show the selectivity of NiO/NiOOH-PrC electrode in phosphate determination. This plot

corresponds to the information for interference study, section 3.4 (**Fig 9** and **Table 1**) in manuscript file. The NiO/NiOOH-PrC electrode showed high level of selectivity to phosphate detection.

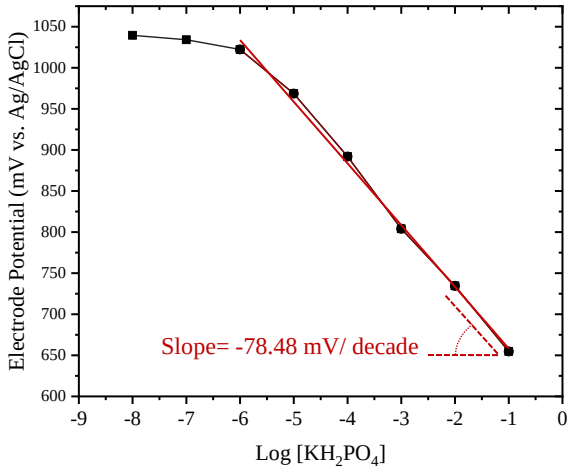

Fig. S2. Potentiometric response of NiO/NiOOH-PrC electrode toward phosphate ions. The electrode obtained by 60 minutes electrodeposited of NiO on printed carbon.

Fig. S2 provides the calibration curve showing potential changes of NiO/NiOOH-PrC electrode by concentration changes of phosphate ions. As it is shown in the plot, the linear range for the developed sensor activity is between 10^{-6}- 10^{-1} M and its detection limit is 10^{-6} M.