

Electrochemical Detection of Alkaline Phosphatase Utilizing Copper Catalyzed Oxidation

이준영, 박현규[†]

한국과학기술원

(hgpark@kaist.ac.kr[†])

A novel alkaline phosphatase (ALP) determination strategy has been developed utilizing copper catalyzed oxidation which could be detected by Impedimetric detection method. For this purpose, pyrophosphate (PPi), a natural substrate of the enzyme which bind to Cu^{2+} ions, was employed. In the presence of ALP, PPi is degraded to phosphate, which cannot bind to Cu^{2+} ions. The DNAzyme modified on the electrodes captures the released Cu^{2+} ions. The rate of ascorbic acid oxidation is increased by the copper complexed DNAzyme leading to accumulation of oxidation products on the electrode surface. Then, interfacial electron-transfer resistance of the electrodes are increased. This increase can be detected by electrochemical impedance spectroscopy (EIS). Using this system, we successfully determined ALP activity with excellent selectivity.