

## Determination of Heavy Metal Ions by Urea Sensor Using ISFET

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A critical evaluation of the potentiometric response of an enzyme ISFET sensor to heavy metal ions is described. This sensor is utilized in this study, which is based on the susceptibility of urease to inhibition by heavy metal ions. We have demonstrated it to be an effective and simple potentiometric sensor for detecting copper, mercury, lead and cadmium ions. The assay procedure involves the reaction of urease and heavy metal ions in samples followed by the enzyme reaction and the electrochemical determination of membrane-bound urease activity. The analytical result is directly displayed by the output voltage of the sensor. In this study, a relationship was obtained between the inhibition rate of response and the heavy metal ion concentrations in a range of 0-10 mg/l. The response of ISFET with the BSA membrane was maintained for two weeks, and a new membrane was easily formed.

### 1. Introduction

Recently, a number of studies have analyzed and reported on the presence of heavy metals in various samples by the use of an analytical apparatus being developed. Metal analysis procedures such as atomic adsorption spectrophotometry (AAS) are the most widely used analytical methods. Additionally, inductively coupled plasma (ICP) atomic emission spectrometry (AES),<sup>(1,2)</sup> anodic stripping