

Urea-FET Sensor Using Polyvinylbutyral Resin Membrane

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A polyvinylbutyral resin membrane was applied to the surface of a silicon nitride coated silicon wafer. The membrane exhibited good adhesive properties. A microurea sensor was constructed using an immobilized urease polyvinylbutyral resin membrane and an Ion Sensitive Field Effect Transistor (ISFET). The characteristics of the sensor system were investigated using urea as the standard substrate. A linear relationship was obtained between the initial rate of the differential gate output voltage change and the logarithmic value of the urea concentration. Urea was determined to be in the range 1.3-16.7 mM. The differential gate output voltage, after injection, achieved a steady state for approximately two minutes. The optimum pH was 7.0 at 37°C. The selectivity was good, but slight responses were obtained when 6.3 mM glucose, 10 mM creatinine and 3.6 μ M albumin were applied to the system. The urea sensor system exhibited a response to 16.7 mM urea for at least two weeks.

1. Introduction

The determination of urea in serum and other biological fluids is important for diagnostic testing in clinical fields. Urea is an indicator to evaluate the functional state of the kidney. Conventional methods for urea determination based mostly

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