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Highly Sensitive Immunosensor with a Solid-State Electrolyte

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A highly sensitive immunosensor for detection of anti immunogloblin G (IgG) was prepared. The detection is based on the change in the electric potential before and after the antigen-antibody reaction. The sensor consists of a semisolid electrolyte and an electrode with an immobilized IgG layer. Agar gel was used for the semisolid electrolyte and IgG was immobilized with methyl arachidate according to the LB method and with polypyrrole according to the electrochemical method. The semisolid electrolyte was found to enhance the output voltage as well as to decrease the noise level. The sensor with the IgG-polypyrrole layer showed a higher sensitivity than that with the IgG-LB film layer. The enhancement of sensitivity was explained using a simplified model.

1. Introduction

Recently, attention has been paid to solid-state biosensors employing microelectronic technologies. For example, various enzyme sensors based on amperometric and potentiometric detection methods have been reported.[1–3]

Solid-state immunosensors have also been reported.[4] These types of sensing methods provide simpler detection than the conventional method based on radio immunoassay.[5] For practical application, however, a crucial problem in the sensitivity still remains.