

Optical Responses of Potential-Sensitive Dye/PMMA Coatings to Taste Solutions

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We previously proposed an optical taste sensor system using a fiber-optic sensor array with potential-sensitive dye/silicone coatings, in which the dye absorption intensity changes with potential change in the dye/silicone coating membrane exposed to taste solutions. However, the silicone coatings have been found to possess poor stability or reproducibility of the response data to taste solutions. Here, we propose a new dye/poly(methyl methacrylate) (PMMA) coating instead of the silicone coatings and provide the optical response characteristics of the dye/PMMA-coated fiber-optic sensors to taste solutions. The dye/PMMA coatings have been found to be more sensitive to tastes and more stable than the dye/silicone coatings. The optical responses of dye/PMMA-coated fiber-optic sensors to tastes have been compared to the potential responses measured by wire electrode sensors coated with the same dye/PMMA coatings as used in the fiber-optic sensors. The results indicate that the optical responses are more sensitive to tastes than the potential responses of electrode sensors.

1. Introduction

There is increasing interest in realizing an artificial taste sensor⁽¹⁾ as well as an artificial olfactory sensor. In these cases, use of a sensor array and pattern recognition techniques is essential for realizing a sensor with both high sensitivity and selectivity.^(2,3) Hayashi *et al.*⁽⁴⁾ have recently developed a taste sensor using potential patterns from an electrode sensor array with artificial lipid membranes. However, very few studies have been published on