Thesis Title	Development of Optical pH Sensor using Alizarin Yellow R Immobilized on Cellulose Acetate Membrane
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Abstract

Optical pH sensing material was prepared using alizarin yellow R (AY) immobilized onto a hydrolyzed cellulose acetate (CA) membrane. Photographic film was color-bleached with sodium hypochlorite and then hydrolyzed with sodium hydroxide to obtain the hydrolyzed membrane. AY was immobilized onto the hydrolyzed membrane from methanol solution. AY was strongly fixed on the CA membrane and unwashable by water. Absorbance spectra was recorded by using visible spectrometer in the wavelength of 380-780 nm. It was found that optical property of dye immobilized on cellulose acetate membrane different from its dissolved form in solution. While the color of immobilized dye was not changed, its color intensity was linearly changed with pH at wavelength 382 nm. The AY-immobilized CA membrane can be useful as a sensor material with a pH working range from 8 to 12 which is wider than that of solution form (pH = 10.1-12). The immobilized membrane showed reversible absorbance intensity pH range between 8 to 12 and response time of less than 5 minutes. The linear correlation between pH value and normalized absorbance intensity of immobilized yellow form at 382 nm with a linear regression coefficient of 0.9773 was obtained. Testing with unknown pH value showed the error of less than 4%. In addition, this study shows that the absorption based AY-immobilized CA membrane pH sensor system can be used with violet LED light source (393 nm) as a compact pH-sensor launched the input signal into an immobilized membrane and the transmitting light was monitored by an optical power meter. The good linear relation was obtained in the pH range between 8 to 12 with a linear regression coefficient of 0.9927.

Keywords: Alizarin Yellow R/Hydrolyzed Cellulose Acetate Membrane/Optical pH Sensor