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## Dual signaling of the water content of biofuel-relevant ethanol and butanol by pyranines

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A simple optical sensor for the measurement of the water content of biofuel-relevant ethanol and 1-butanol based on the pyranine fluorophore was investigated. The diethylsulfonamide derivative showed pronounced absorption and fluorescent signaling in response to changes in the water content of ethanol and 1-butanol. The signaling is based on the increased dissociation of the hydroxyl group of pyranine in response to the increasing water content of the alcohol solutions. The signaling behavior of the sensors was analyzed readily by ratiometric measurements using the absorption and fluorescence characteristics of the undissociated and dissociated form. Upon derivatization to diethylsulfonamide, the signaling became more sensitive than that for its parent pyranine. The detection limit of the pyranine and diethylsulfonamide derivative for the measurement of the water content in ethanol was 1.0% and 0.03%, respectively. On the other hand, the detection limit of the diethylsulfonamide derivative for the determination of water content in 1-butanol was 0.02%, while underivatized pyranine was not useful due to the limited solubility of the sensor. The practical application of the measurement of the water content in ethanol and 1-butanol by a smartphone as an easy-to-use colorimetric device was also explored.

### Biography

Yun-uk Jung obtained his Bachelor's degree from the department of chemistry at Chung-Ang University in 2015. He is currently master candidate in same university. His research interest is development of chromogenic and fluorogenic probes for biologically important species.

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