

# A Study on pH-Responsive Photosensitizers for Potential Applications in Molecular Robotics

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Molecular robotics has emerged as a novel research area that aims to rationally design and implement dynamic artificial systems consisting of self-assembled molecules [1]. In order to realize robot-like molecular systems which correctly respond to outer stimuli, several classes of molecular devices are necessary including sensors, actuators, and compartments. With respect to sensors, a number of fluorescent probes were developed in our laboratory in the last decade that were designed on the principle of photoinduced electron transfer (PeT) [2-3], Förster resonance energy transfer (FRET) [4], and so on. However, these fluorescent sensors are not suitable for use in molecular robotics because it is difficult to convert their output signal (i.e. fluorescence emission) to the next chemical reaction. Hence, we are focusing on the development of a novel sensor system that is based on activatable photosensitizers [5].

As a proof of principle, we herein designed and synthesized a novel pH-responsive photosensitizer using 2I-BODIPY [6]. In this presentation, we will present the photophysical properties of the compound and discuss future directions.

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