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Fluorescent probes with changeable π-conjugated systems

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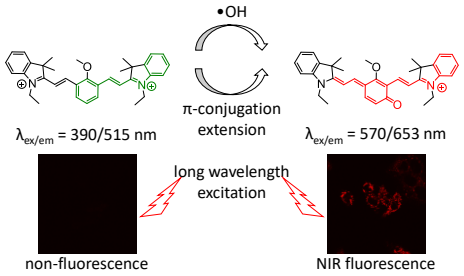
Abstract:

Fluorescent probes and fluorescent microscopy have been investigated extensively in biochemistry due to their high sensitivity and good spatial-temporal resolution. Reactive oxygen species and enzymes are two kinds of important active biomolecules. They are involved in various physiological function, such as proliferation, differentiation and immune. The development of fluorescent probes for these active biomolecules with superior analytical performance are crucial for better understanding their role in life. To make the probe's signal induced by chemical recognition more predictable, we have put forward changeable π-conjugated systems, with which the probe exhibited distinct alteration in spectroscopic characteristic and high signal/background ratio. Here, we report a rationally designed fluorescence •OH probe with changeable π-conjugated systems. The probe was designed by utilizing the unique aromatic hydroxylation and the electrophilicity of •OH, and its reaction with •OH leads to the formation of a larger π-conjugated structure. As a result, the probe shows great sensitivity and selectivity towards •OH. Particularly, the probe can detect the •OH from iron autoxidation without the addition of H_2O_2 in both buffers and living cells.



References:

1 Shi, W.; Ma, H. M. *Chem. Commun.* **2012,** *48*, 8732-8744.

2 Li, H. Y.; Li, X. H.; Shi, W.; Xu, Y. H.; Ma, H. M. *Angew. Chem. Int. Ed.* **2018,** *57*, 12830-12834.

Bio-Sketch of the Speaker

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Prof. Shi has focus on the design, synthesis and applications of spectroscopic probes towards biological substances. These include: (1) designing and preparing rhodamine lactones as spectroscopic probes based on the mechanism of changeable π--conjugation structure; (2) developing new spectroscopic probes and imaging methods towards several enzymes and redox species based on their chemical properties; (3) constructing new probes with long-wavelength and ratiometric responses to image the biological species quantitatively and sensitively.