

# Accepted Manuscript

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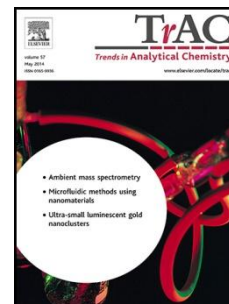
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PII: S0165-9936(16)30208-4

DOI: <http://dx.doi.org/doi: 10.1016/j.trac.2016.09.006>

Reference: TRAC 14825

To appear in: *Trends in Analytical Chemistry*



Please cite this article as: Huai-Song Wang, Development of fluorescent and luminescent probes for reactive oxygen species, *Trends in Analytical Chemistry* (2016), <http://dx.doi.org/doi: 10.1016/j.trac.2016.09.006>.

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# Development of fluorescent and luminescent probes for reactive oxygen species

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## Highlights

- Reactive oxygen species (ROS) can mediate a wide variety of biological processes.
- Due to their reactive and transient nature, ROS are generally difficult to determination.
- Fluorescent and luminescent probes for monitoring ROS in biological systems.
- ROS probes (including small organic molecules, metal complexes and nanomaterials) were discussed.
- The design strategies and ROS sensing mechanisms of these functional probes were described.

## ABSTRACT

Reactive oxygen species (ROS) are chemically reactive molecules that can mediate a wide variety of biological processes. The imbalance of these reactive intermediates in the metabolism will result in the phenomenon known as oxidative stress. Therefore, a great number of approaches have been developed for measuring ROS in biological systems. Due to their reactive and transient nature, the ROS are generally difficult to determination. Fluorescent and luminescent probes for monitoring ROS have shown advantages such as high sensitivity, selectivity, as well as real-time imaging, which can yield visible information about the ROS. The recent progress in preparing ROS probes (including small organic molecules, metal complexes or nanomaterials) for detecting and imaging of ROS production in living cells or whole organisms were summarized in this review. The design strategies and ROS sensing mechanisms of these functional probes were described.

**Keywords:** Reactive oxygen species; Fluorescent probes; Luminescent probes; Multi-functional probes; Ratiometric probes; Biological systems

## 1. Introduction

Reactive oxygen species (ROS), as a class of highly reactive chemicals, play important roles in varieties of physiological and pathological processes.[1, 2] The balance of oxidation-antioxidation

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