

A gel-based platform for the detection of multiple analytes through lanthanide photoluminescence

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ABSTRACT: About a decade ago, we discovered a facile method to enhance the luminescence from lanthanides through the self-assembly of multiple components in a metallohydrogel. Using this strategy, we have developed a ‘pro-sensitizer’ (masked sensitizer) based protocol for detecting enzymes and bio-relevant small molecules (Fig. 1). We have also discovered that several natural products and clinically useful drugs can sensitize lanthanides, and thus the gel-based platform provides opportunities to detect and quantify such species as well.

The advantage of this technique is that the output is independent of the analyte being sensed (green/red photoluminescence of Tb³⁺/Eu³⁺) and in many cases, pre-processing of the sample is not required. For several enzymes present in blood serum and natural product extracts, the presence of the analyte can be readily inferred using an inexpensive, hand-held long-wave UV lamp. We have also developed a low-cost, paper-based method to simplify the assay and believe that further developments can lead to useful, real-life applications.

KEY WORDS: paper-based sensing, photoluminescence, enzyme assay

References

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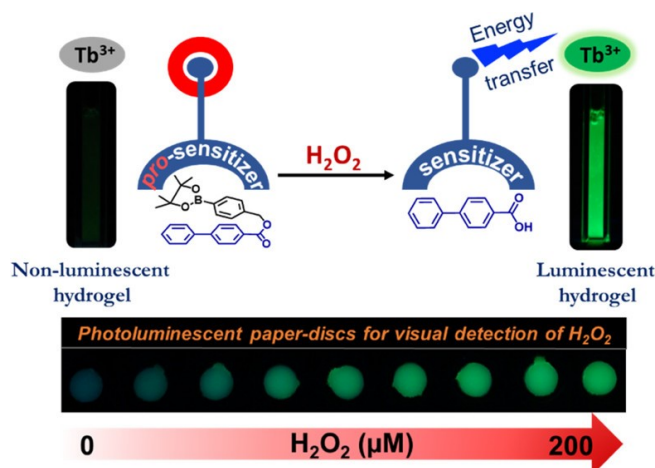


Figure 1: The general strategy for using masked sensitizer for detection of analytes through lanthanide photoluminescence.