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# **Mn<sup>2+</sup>-doped NaYF<sub>4</sub>:Yb,Er upconversion nanoparticles for detection of uric acid based on the Fenton reaction**

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## **ABSTRACT**

A novel fluorescence method for the determination of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and uric acid (UA) was developed. The procedure was based on the hydroxyl radicals ( $\cdot\text{OH}$ ), which effectively quenched the fluorescence of the Mn<sup>2+</sup>-doped NaYF<sub>4</sub>:Yb,Er upconversion nanoparticles (UCNPs). Based on the property of Mn<sup>2+</sup>-doped NaYF<sub>4</sub>:Yb,Er upconversion nanoparticles, the Fenton reaction and enzymatic reaction of uric acid, this method could be used for highly sensitive detection of H<sub>2</sub>O<sub>2</sub> and uric acid. Under optimal conditions, we observed that the fluorescence quenching signal showed good linearity with the H<sub>2</sub>O<sub>2</sub> concentration in the range of  $3.00 \times 10^{-8}$  M ~  $6.00 \times 10^{-5}$  M, and the detection limit of this assay was  $1.30 \times 10^{-8}$  M. Meanwhile, the linear concentration range for UA was  $4.00 \times 10^{-9}$  M ~  $1.00 \times 10^{-5}$  M, and the lower

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