Electronic Supplementary Material

Au-Hg/rGO with enhanced peroxidase-like activity for sensitively colorimetric determination of H_2O_2

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Condition optimization

Like natural enzyme or other nanozyme, the peroxidase-like activity of Au-Hg/rGO nanocomposites was also affected by the pH of the buffer and the reaction temperature.[1] Therefore, to obtain the highest catalytic activity, the effects of difference pH (2.0-8.0) and temperature (15-40 °C) were studied. As shown in Fig. S1A, the maximum relative activity of Au-Hg/rGO nanocomposites was observed at pH 5.0, and the relative activity greatly decreased in relatively strong acidic or alkaline conditions. In the stronger acidic environment, the oxidation of TMB is not ready to occur. In the alkaline condition, H_2O_2 can be easily decomposed into oxygen.[2] From Fig. S1B, it can be clearly seen that an increase of temperature from 15 °C to 20 °C resulted in the increased relative activity whereas a further increase of temperature caused a decreased relative activity. At high temperatures, H_2O_2 is apt to decompose into H_2O and O_2. At low temperatures, the electron transfer rate is limited.[3] So, subsequent experiments were conducted using Au-Hg/rGO nanocomposites at pH 5.0 and reaction temperature of 20 °C as the optimum analytical conditions.

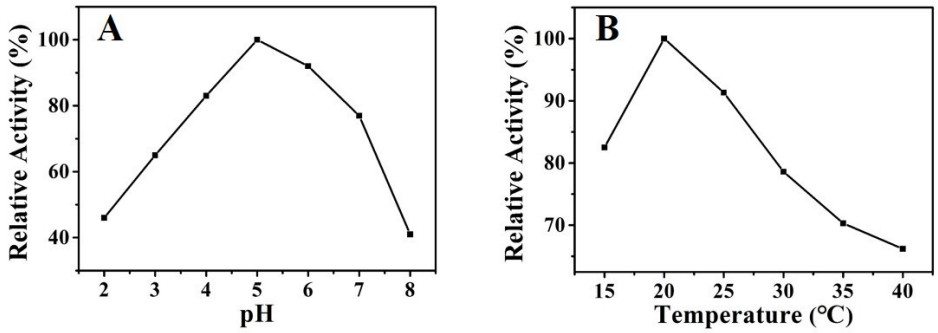

Fig. S1 Effects of pH (A) and temperature (B) on the peroxidase-like activity of Au-Hg/rGO nanocomposites.

References

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