

Supplementary Information

A temperature-sensitive and fluorescent Tr-CDs/AuNPs based catalyst for efficient, monitorable, and recyclable catalytic reactions

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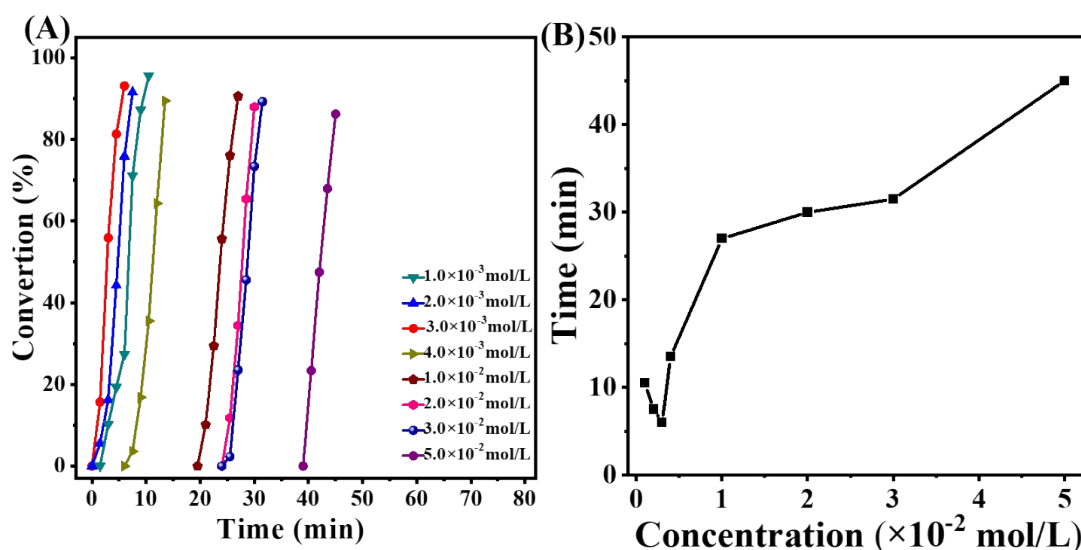


Fig. S1 (A) Changes in conversion of the catalytic system under different 4-NP concentrations; (B) changes in the time required for the reaction to complete.

In a catalytic system, a low concentration of reactants may result in a low chance of collision between the reactants and the catalyst. If the concentration of reactants is too high, it will coat the surface of the catalyst and hinder the contact between the catalyst and the reactants, which in turn affects the catalytic rate of the system. Therefore, we investigated the effect of 4-NP concentration on the catalytic reaction rate of the system. The results are shown in Fig. S1. The catalytic reaction can be completed in a few minutes with the concentration of 4-NP in the range of 1.0×10^{-3} mol/L to 3.0×10^{-3} mol/L, and the catalytic rate gradually increased with the increase in 4-NP concentration. This is because, under the condition of low 4-NP concentration, the contact opportunity between 4-NP and Tr-CD /AuNPs is limited, and the active sites on the surface of Tr-CD /AuNPs cannot be fully utilized. At this time, increasing the concentration of 4-NP can increase the opportunity of collision with the catalyst, allowing the active sites on the surface of the catalyst to be more fully utilized, thus accelerating the catalytic reaction. However, the catalytic rate began to decrease when the 4-NP concentration was further increased. This phenomenon is attributed to the fact that too high a concentration of 4-NP leads to a large amount of 4-NP covering the surface of Tr-CD /AuNPs, which, on the one hand, will lead to a decrease in the effective utilization of the active sites on the surface of Tr-CD /AuNPs, and on the other hand, may have an unfavorable effect on the structure and performance of Tr-CD

/AuNPs, thereby decreasing the catalytic activity and stability of Tr-CD/AuNPs. To summarize, the catalytic rate was highest when 3.0×10^{-3} mol/L of 4-NP was added, and this concentration was the optimal reactant concentration.