Supplementary information for

Antibacterial activity of the NIR-induced Zn ions release film

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Preparation of gold nanorods:

For making the seed solution, 120 μl of 20 mM hydrogen tetrachloroaurate solution ($HAuCl_4$, Aladdin, China) and 2.5 ml deionized (DI) water were dropped in 5 ml of 100 mM cetytrimethylammoium bromide solution (CTAB, Aladdin, China) under magnetic stirring to form a yellow mixture solution. Then 600 μl of 10 mM freshly prepared sodium borohydride solution ($NaBH_4$, Aladdin, China) through slightly freezing was dropped slowly to form the brownish yellow mixture solution. After the stirring at an even speed of 3 min, the seed solution was left to rest at least 4 h in the dark before use.

For making the growth solution, 800 μl of 10 mM silver nitrate solution ($AgNO_3$, Aladdin, China) and 1.5 ml of 20 mM $HAuCl_4$ solution were mixed into 30 ml of 100 mM CTAB solution. After that, freshly prepared 100 mM ascorbic acid solution (Aladdin, China) was dripped into the yellow mixture solution under moderate stirring at an even speed. After the solution changed to colorless, 76 μl seed solution of gold nanorods was dripped. Finally, the growth solution of gold nanorods was left undisturbed about 12 h at room temperature. Before self-assembling gold nanorods on Ti surface, the gold nanorods solution was centrifuged at 10000 rpm twice. Each centrifugation time is 20 min. After the first centrifugation, the gold nanorods were dispersed in DI water, and after the second centrifugation, the 15 mM sodium chloride (NaCl, Aladdin, China) is used to disperse the purified gold nanorods.

Characterization of gold nanorods:

The structure and absorption spectra of gold nanorods were characterized by

transmission electron microscopy (TEM, JEM-2100F, Japan) and ultraviolet and visible spectrophotometer (Lambda 750, PerkinElmer, USA). In Figure S1, The prepared gold nanorods have a rod-shaped structure with an aspect ratio of 4.2. After assembling on the Ti surface, the gold nanorods still maintain their morphology (Figure 2a). As can be seen from Figure S2, the 808 nm feature peak of gold nanorods can be found in the Uv-vis-NIR absorption curves. Therefore, the prepared gold nanorods can absorbed the 808 laser irradiation in the bacteria and cell tests.

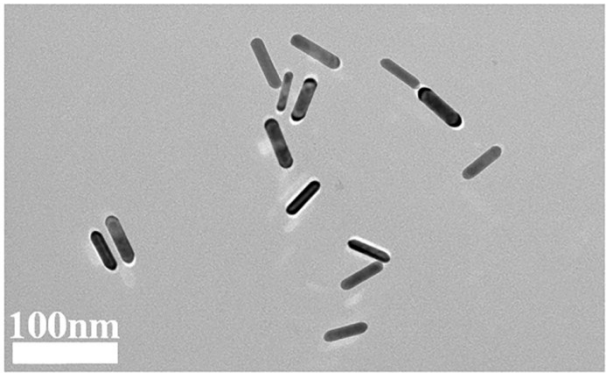

Figure S1. TEM image of gold nanorods.

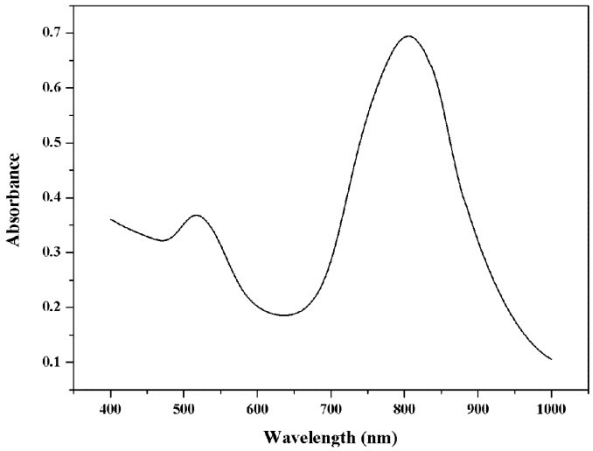

Figure S2. Uv-vis-NIR spectrum of gold nanorods.