Supporting Information

Construction of Perfluorohexane/IR780@Liposome Coating on Ti for Rapid Bacteria Killing under Permeable Near Infrared Light

Xiuhua Wang a, Lei Tan a, Xiangmei Liu a, Zhenduo Cui b, Xianjin Yang b, Kelvin W. K. Yeung c, Paul K. Chu d, Shuilin Wu *ab

a Hubei Collaborative Innovation Center for Advanced Organic Chemical Materials, Ministry-of-Education Key Laboratory for the Green Preparation and Application of Functional Materials, Hubei Key Laboratory of Polymer Materials, School of Materials Science & Engineering, Hubei University, Wuhan 430062, China.
b School of Materials Science & Engineering, Tianjin University, Tianjin 300072, China. E-mail: shuilin.wu@gmail.com; shuilinwu@tju.edu.cn (S.L. Wu); liuxiangmei1978@163.com
c Department of Orthopaedics & Traumatology, Li KaShing Faculty of Medicine, The University of Hong Kong, Pokfulam, Hong Kong 999077, China.
d Department of Physics and Department of Materials Science and Engineering, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong 999077, China.
**Figure S1.** Structure and design of the oxygen self-enriched PDAT system. The photosensitizer and perfluorohexene are co-encapsulated by liposome and dispersed uniformly inside the liposome.
Figure S2. GC-MS spectra of PFH and Lip(IR780+PFH).
Figure S3. The zeta potential of Lip, Lip(IR780) and Lip(IR780+PFH) (mean ± SD, n = 3, ***$p < 0.001$).
Figure S4. The photostability of different liposome. The UV-Vis absorption spectrum of IR780, Lip(IR780) and Lip(IR780+PFH) measured right after the dilution process or 1 day of storage (under light or darkness).
**Figure S5.** Postulated reaction mechanism for chemisorption of liposome by AHT.
Figure S6. The morphologies of Ti, AHT, Lip-Ti, Lip(IR780)-Ti, Lip(IR780+PFH)-Ti observed by AFM.
Figure S7. EDS spectra of Lip-Ti, Lip(IR780)-Ti, and Lip(IR780+PFH)-Ti.
Figure S8. XPS spectra of different liposome modified AHT.
Figure S9. The corresponding oxygen concentration of Lip, Lip(IR780), Lip(IR780+PFH) and deoxygenated water when the oxygen concentration reached the equilibrium of (a) (n=3, *P < 0.05, **P < 0.01); Oxygen concentration changes in real time of different samples on Ti plates in deoxygenated water (b).
Figure S10. Representative images of the plate samples showing colonies of *S. aureus* and *E. coli* incubated with Lip(PFH) under the irradiation of NIR for 15 min or in the dark compared with the control group.
Figure S11. Representative images of the plate samples showing colonies of *E. coli* and *S. aureus* incubated with different samples under irradiation of NIR for 15 min or in darkness;
Figure S12. Inflammatory cell ratios calculated from bone tissue H&E staining data. Inflammatory cell ratios = [(total area of lymphocyte, monocytes and neutrophil)/area of tissue] × 100%, n=3 animals per group, *P < 0.05, **P < 0.01.
Table S1. Surface roughness of different samples which is analyzed by AFM software.

<table>
<thead>
<tr>
<th></th>
<th>MP-Ti</th>
<th>AHT</th>
<th>Lip-Ti</th>
<th>Lip (IR780)-Ti</th>
<th>Lip (IR780+PFH)-Ti</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Root mean square (nm)</strong></td>
<td>20.817</td>
<td>91.212</td>
<td>10.134</td>
<td>5.667</td>
<td>7.646</td>
</tr>
<tr>
<td><strong>Roughness average (nm)</strong></td>
<td>14.307</td>
<td>71.405</td>
<td>8.139</td>
<td>4.518</td>
<td>5.913</td>
</tr>
</tbody>
</table>