ELECTRONIC SUPPLEMENTARY INFORMATION

Light-controllable systems based on TiO_2-ZIF-8 composites for targeted drug release: communicating with tumour cells

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1. Synthesis of ZIF-8 TNT nanocomposites

To obtain ZIF-8-TNT nanocomposites with optimal morphologies, TNT plates were immersed in solutions prepared with various ratios of zinc acetate ($Zn(OAc)_2 \cdot 2H_2O$), 2-methylimidazole (Hmim), and deionized water (H_2O). Depending on the Zn/Hmim/H_2O ratio, the precipitated layers had different morphology and topology of ZIF-8 crystals, as shown in Figure S1. In the case of a low Zn/Hmim ratio, such as 1/5, the precipitated layer had diamondoid (dia) topology (Figure S1, left), while a high Zn/Hmim ratio, such as 1/35 resulted in pure sodalite (sod) topology (Figure S1, right). In both cases, particles were agglomerated, with a tendency to form colonies. In contrast, at an intermediate ratio of Zn/Hmim = 1/10, the precipitated layer was thin, nearly forming a monolayer with well dispersed crystallites of almost uniform sizes, though there was a mixture of both sod and dia topologies (Figure S1, middle). For the purpose of the study, this morphology was chosen as the optimal to form DOXO-ZIF-8-TNT nanocomposites.

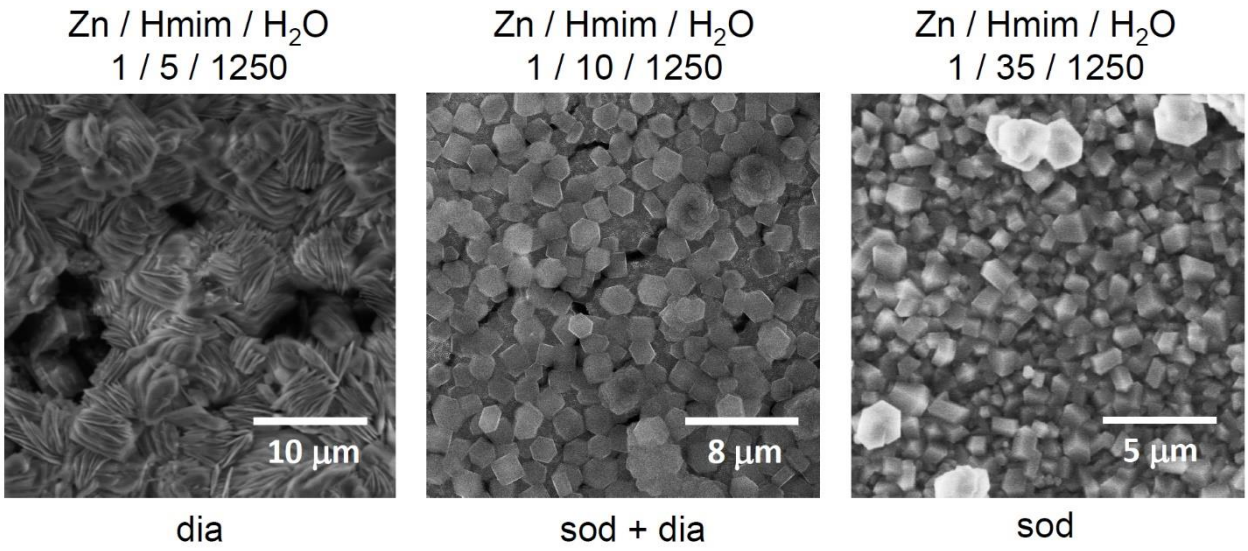

Fig. S1 SEM images of ZIF-8 precipitates on TNT after immersing in solutions with various Zn/Hmim/H_2O ratios.

2. Comparison of doxorubicin release kinetics by TNT and ZIF-8-TNT nanocomposites

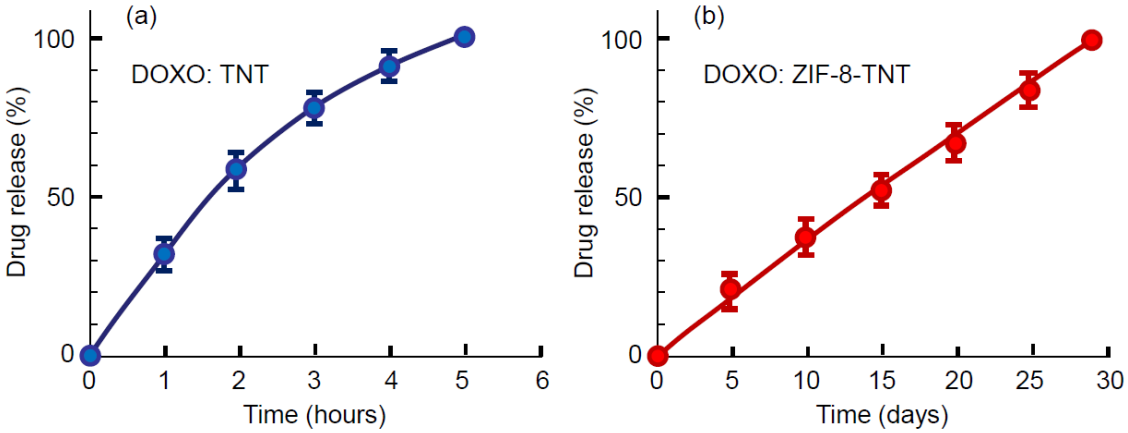

Fig. S2 Release kinetics of doxorubicin from (a) TNT and (b) ZIF-8-TNT nanocomposites at temperature 37 °C and pH 7.4.

3. SEM/EDX and FTIR analyses of ZIF-8 decomposition on a TNT plate upon UV irradiation

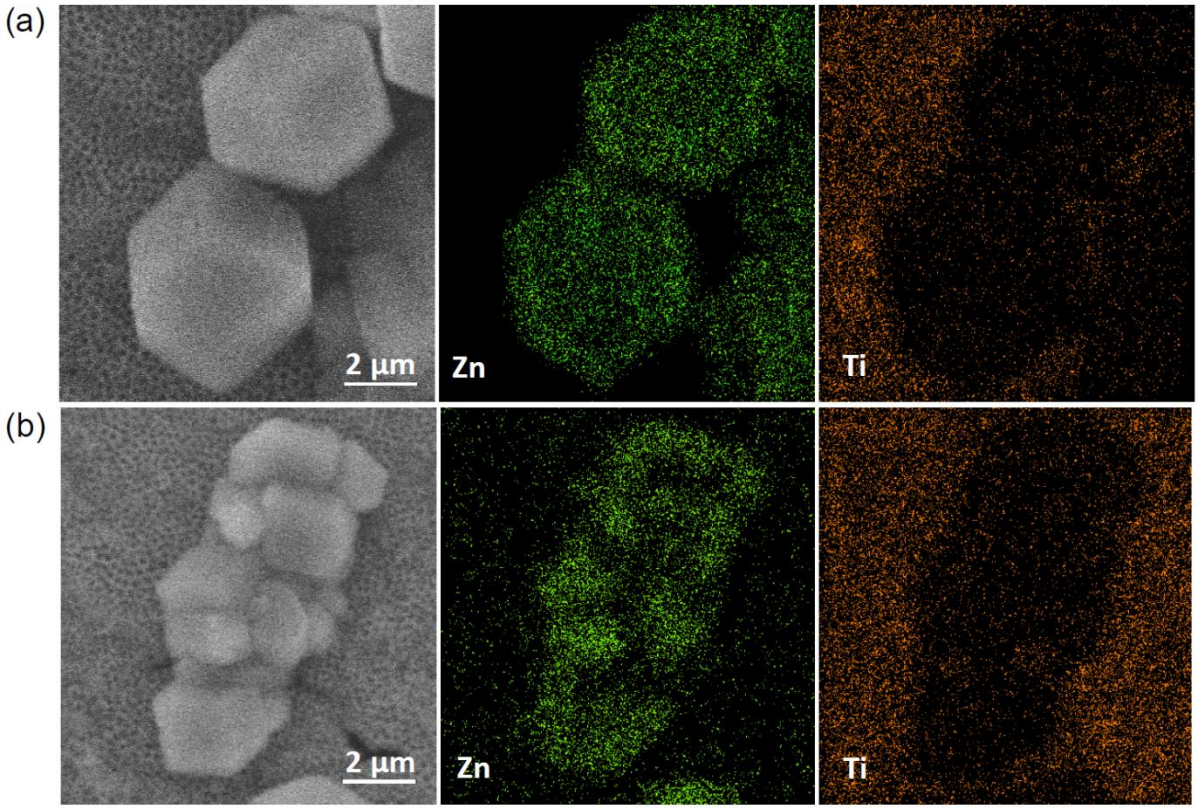

Fig. S3 SEM/EDX images of DOXO-ZIF-8-TNT nanocomposites before (a) and after (b) UV irradiation for 90 min at 37 °C

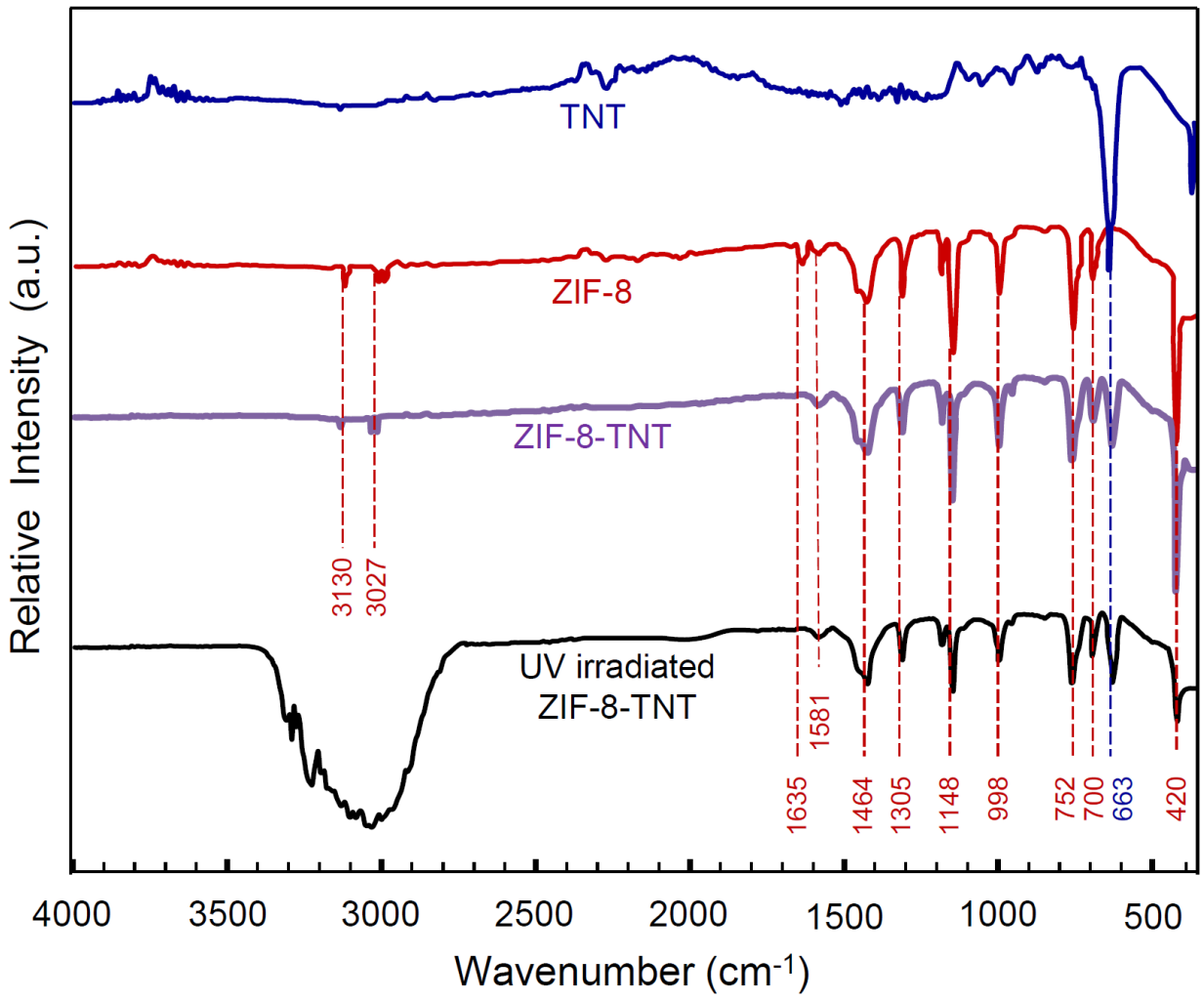

Fig. S4 FTIR spectra for TNT, ZIF-8, ZIF-8-TNT samples (non-irradiated) and a ZIF-8-TNT sample subjected to UV irradiation for 90 min at 37 °C