

Functional TiO₂ nanocoral architecture for light-activated cancer chemotherapy

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Supplementary data

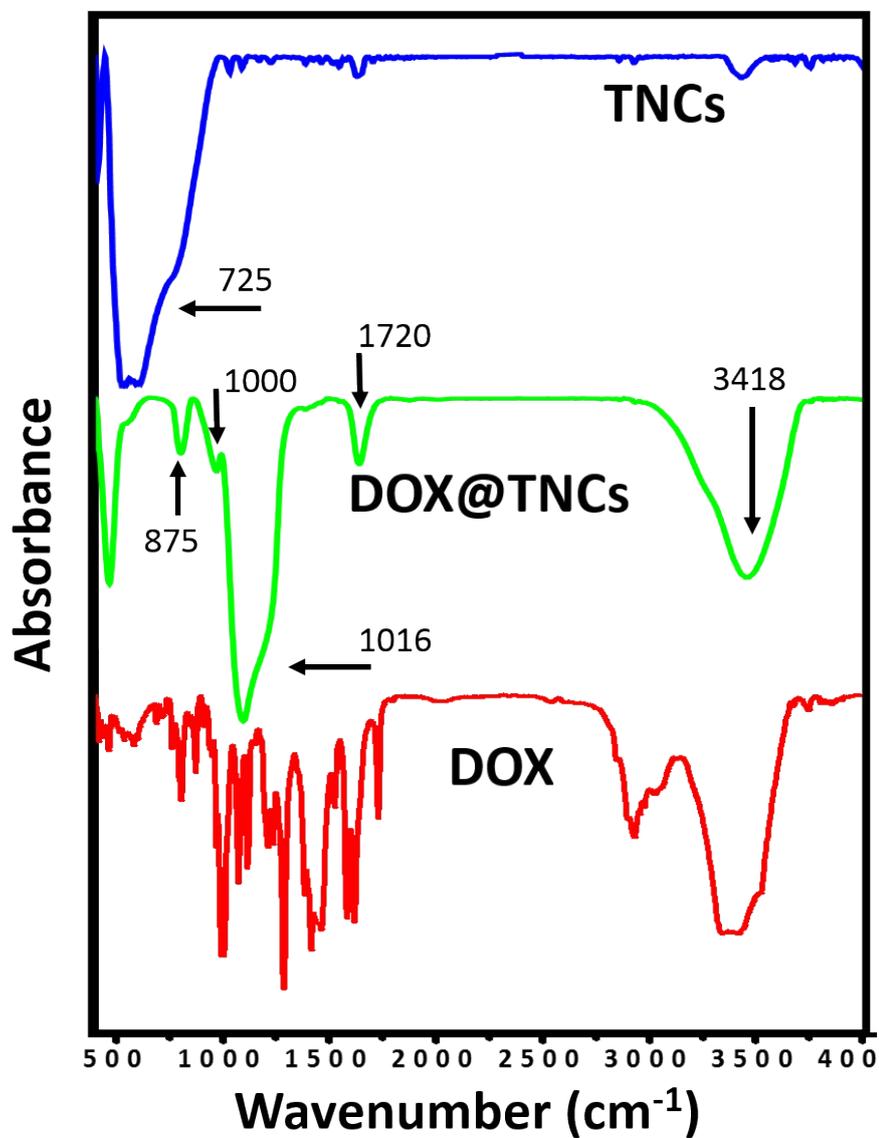


Figure S1. FTIR spectra of TNCs, DOX-TNCs and only DOX.

The transformation of TNCs and the subsequent covalent immobilization of DOX on mPEG capped TNCs were spectroscopically confirmed by FTIR. The collected IR spectra for TNCs, DOX-TNCs and only DOX are shown in Figure S1. The IR spectrum of free DOX is provided

for comparison. The IR spectrum of TNCs exhibited a broad band centered at 725 cm^{-1} , which could be assigned to the stretching mode of the Ti–O–Ti bond. The IR spectrum of DOX-TNCs showed the stretching vibration mode of the carbonyl group at 1720 cm^{-1} and skeleton vibration peak at 1000 and 1016 cm^{-1} . Accordingly, intensive characteristic bands due to mPEG decorated TNCs bonding with DOX such as the O–H stretching mode at 3424 cm^{-1} is also observed. The other all characteristic IR bands of DOX were also observed, indicative of the immobilization of DOX on the surface of TNCs.

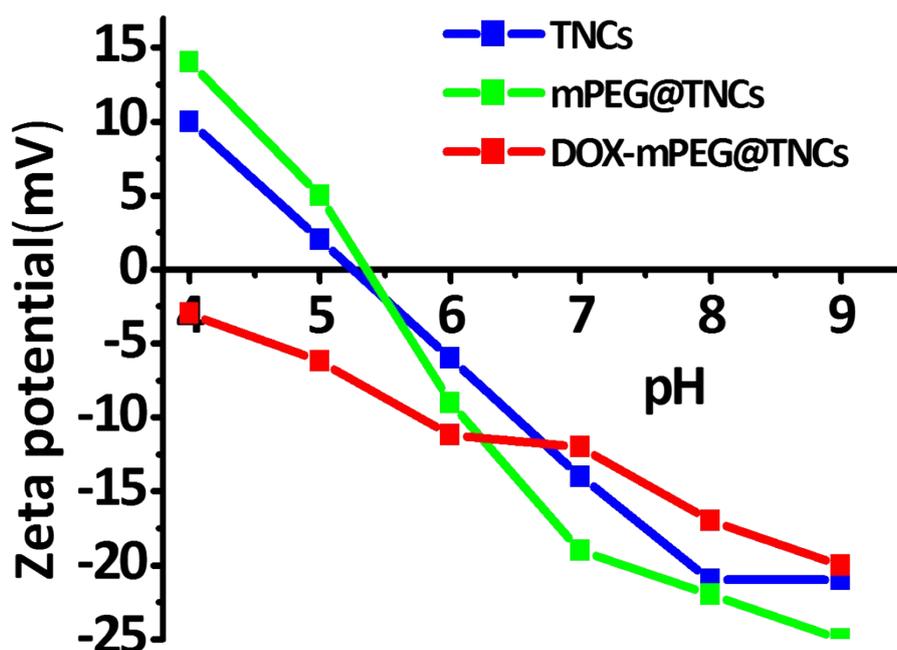


Figure S2. Zeta potential analysis of TNCs, mPEG@TNCs and DOX-mPEG@TNCs suspensions in water with respect to pH.

The zeta potential values of TNCs, mPEG@TNCs and DOX-mPEG@TNCs suspensions in water with respect to pH are shown in Figure S2. The isoelectric point of TNCs, mPEG@TNCs is 5.2 and 5.3, respectively. The bare TNCs, showed a negative zeta potential of -14 while following surface modification with mPEG the zeta potential increased to -20 at pH 7. This change in the zeta potential values may be attributed to the presence of mPEG on the surface. mPEG molecule can provide much steric hindrance because of its methyl terminal group. While in the case of DOX-mPEG@TNCs the zeta potential analysis shows a clear shift in from towards -11mV. The increase in zeta potential value in the case of DOX-mPEG@TNCs is binding of cationic DOX (protonated primary amine present on the drug induces a positive charge) with negatively charged nanocarrier predominately through electrostatic interactions and which leads to increase in zeta potential value.