Supporting Information

On-demand Release of Encapsulated ZnO Nanoparticles and Chemotherapeutics for Drug Delivery Applications

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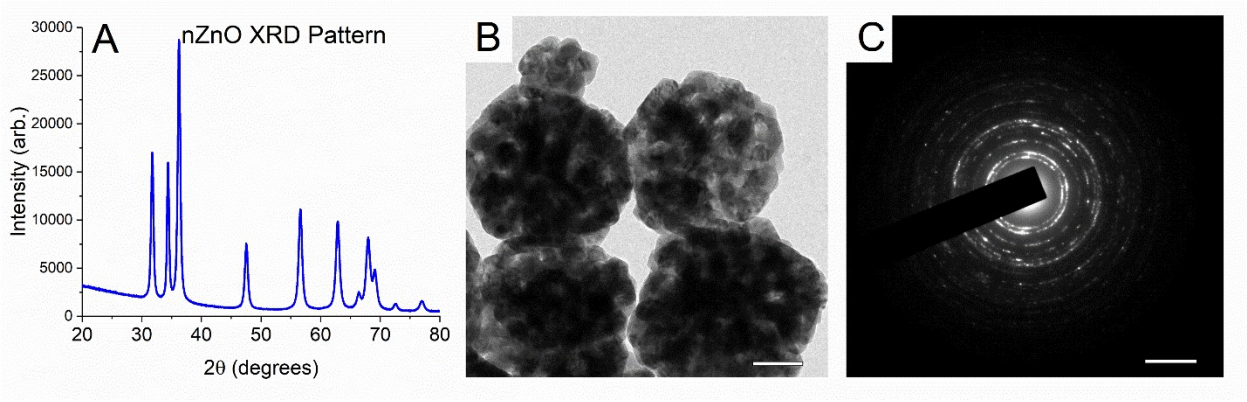

Figure S1. (A) XRD pattern of the synthesized nZnO. From the XRD pattern, the calculated average crystal size of the nZnO is 15 nm. (B) TEM image of the aggregates composed of the smaller nZnO crystals (scale bar- 50 nm). (C) Electron diffraction pattern of the nZnO (scale bar 5/2 nm).

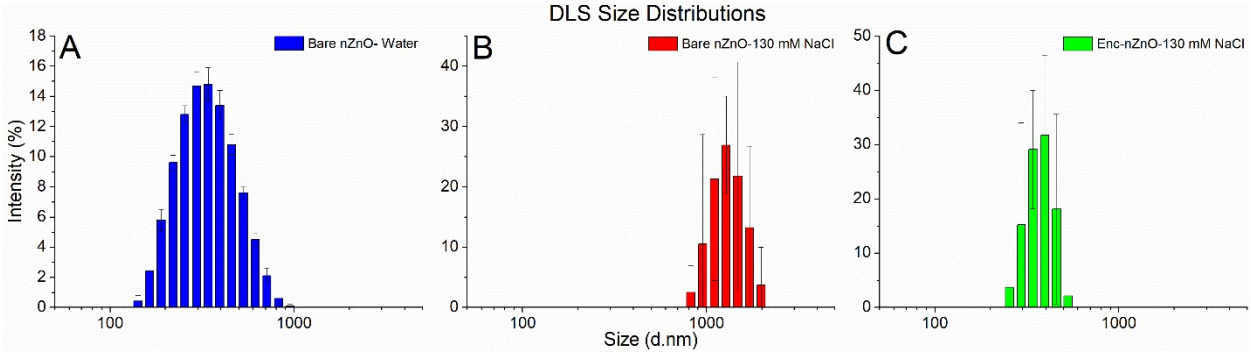

Figure S2. nZnO hydrodynamic size distributions from DLS measurements. (A) Bare nZnO suspended in nanopore water. (B) Bare nZnO suspended in 130 mM NaCl. (C) Lipid encapsulated nZnO suspended in 130 mM NaCl. nZnO suspended in nanopore water have a broad distribution between 100 and 1000 nm. In the salt solution the bare NPs agglomerate into much larger hydrodynamic sizes in the micrometer range. Encapsulating the nZnO in lipids prevents the nZnO from agglomerating into the large particles even in the 130 mM NaCl solution and their hydrodynamic size distribution was similar to bare nZnO in nanopore water.

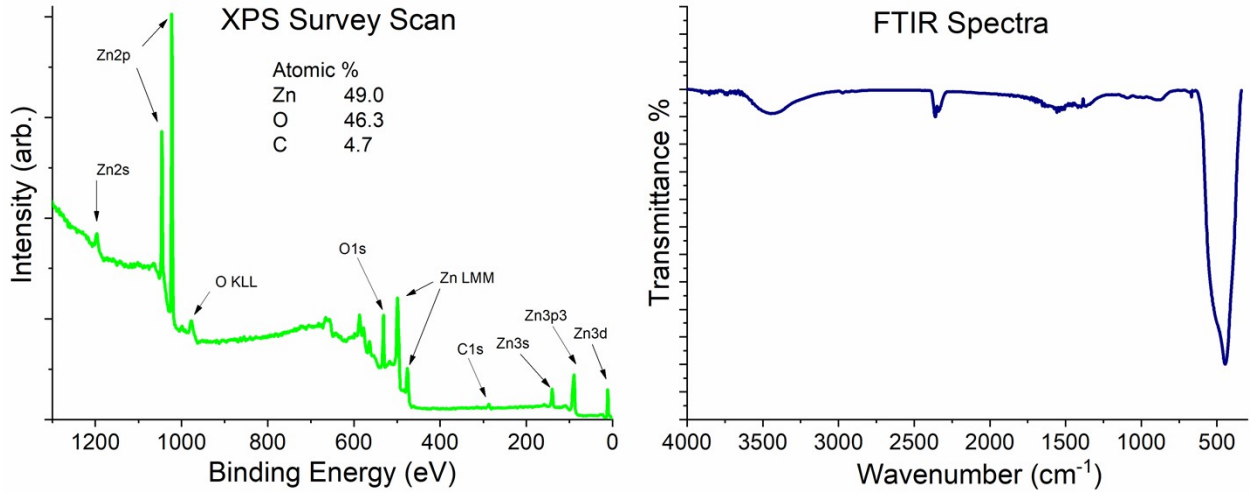

Figure S3. XPS scan of the nZnO before encapsulation demonstrate no other elements besides zinc, oxygen and carbon are present. FTIR spectra confirms the sample purity seen with XPS measurements. The main peak near 500 cm^{-1} is from the Zn-O modes. The other broad peak near 3400 cm^{-1} is from O-H and the other minor peaks are attributed to carbon dioxide.

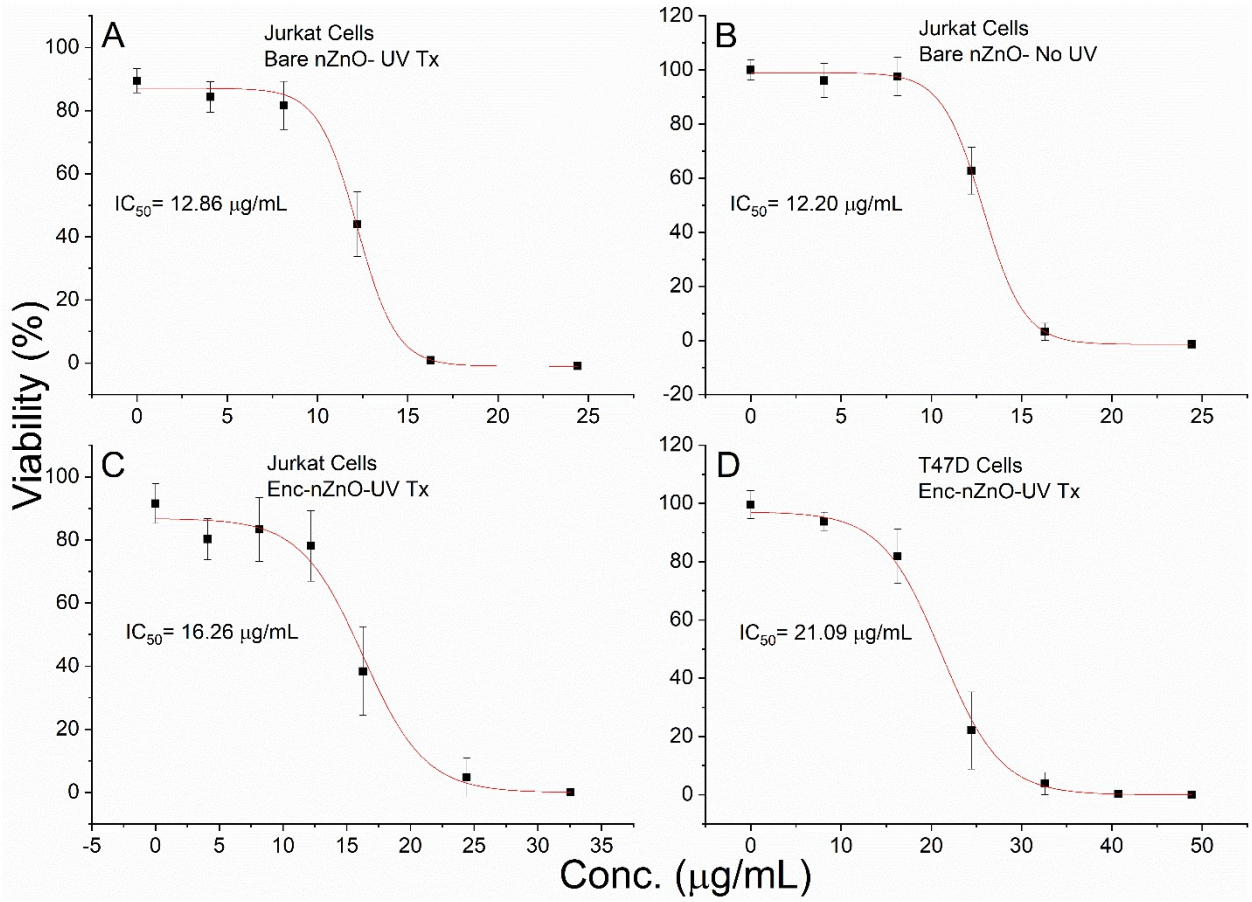

Figure S4. Dose-response curves of (A) Jurkat cells treated with bare nZnO- with UV irradiation, (B) Jurkat cells treated with nZnO- no UV irradiation, (C) Jurkat cells treated with lipid encapsulated nZnO- with UV irradiation, and (D) T47D cells treated with lipid encapsulated nZnO- with UV irradiation.

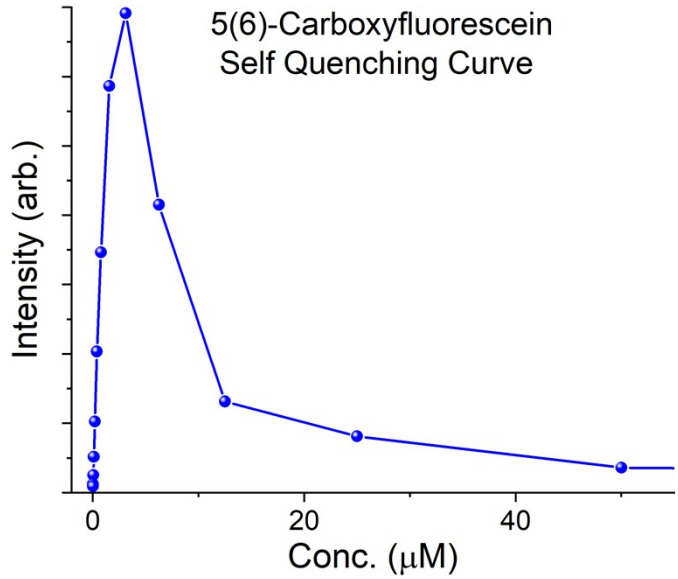

Figure S5. Self-quenching curve of 5(6)-Carboxyfluorescein in 130 mM NaCl. Concentrations below 1.5 μM demonstrate a linear increase in intensity vs. concentration. Working below this concentration in solution allows for evaluations on the release kinetics of the dye that was co-encapsulated with nZnO.