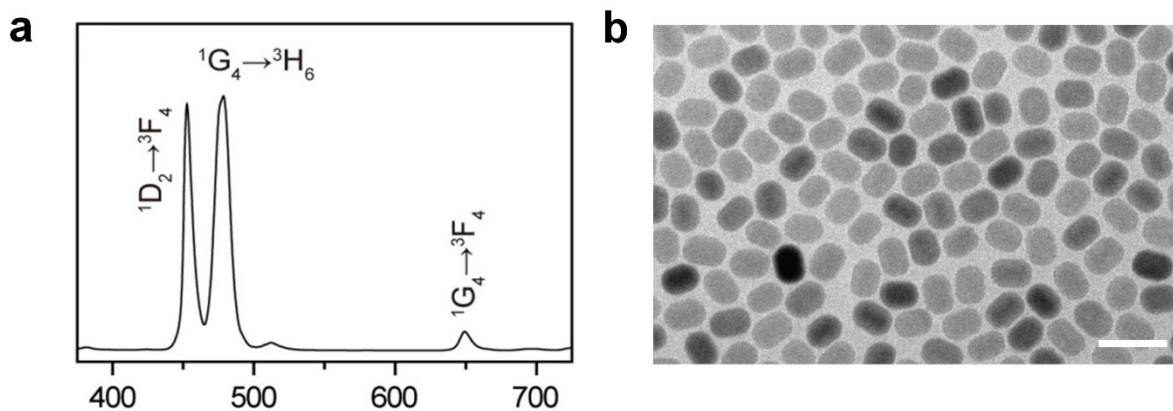
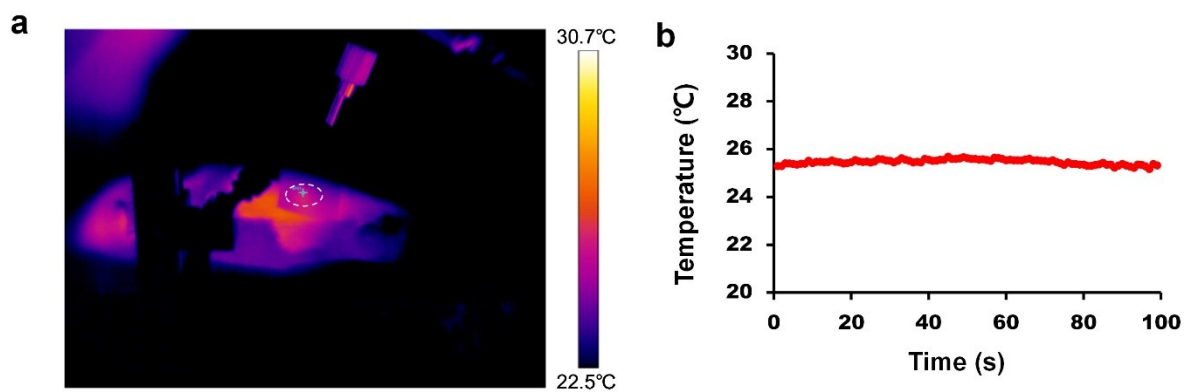


## **Supplementary Information**

### **Flexible and Fully Implantable Upconversion Device for Wireless Optogenetic Stimulation of Spinal Cord in Behaving Animals**



**Figure S1.** Characterization of UCNP. (a) The fluorescence emission spectrum of UCNPs doped with  $\text{Tm}^{3+}$  under 980 nm NIR laser excitation. (b) Transmission electron microscopy (TEM) image of the  $\text{NaYF}_4:\text{Yb/Er}$  nanoparticles. Scale bar, 100 nm.



**Figure S2.** Characterization of temperature of optrode-implanted region. (a) Infrared imaging of a live rat implanted with UCNP-PP-optrode under pulsed NIR laser stimulation. (b) Temperature recording shows little temperature fluctuation at the optrode area (white dashed circle in a) under NIR laser stimulation.

Supplementary video is also provided as a separate file.