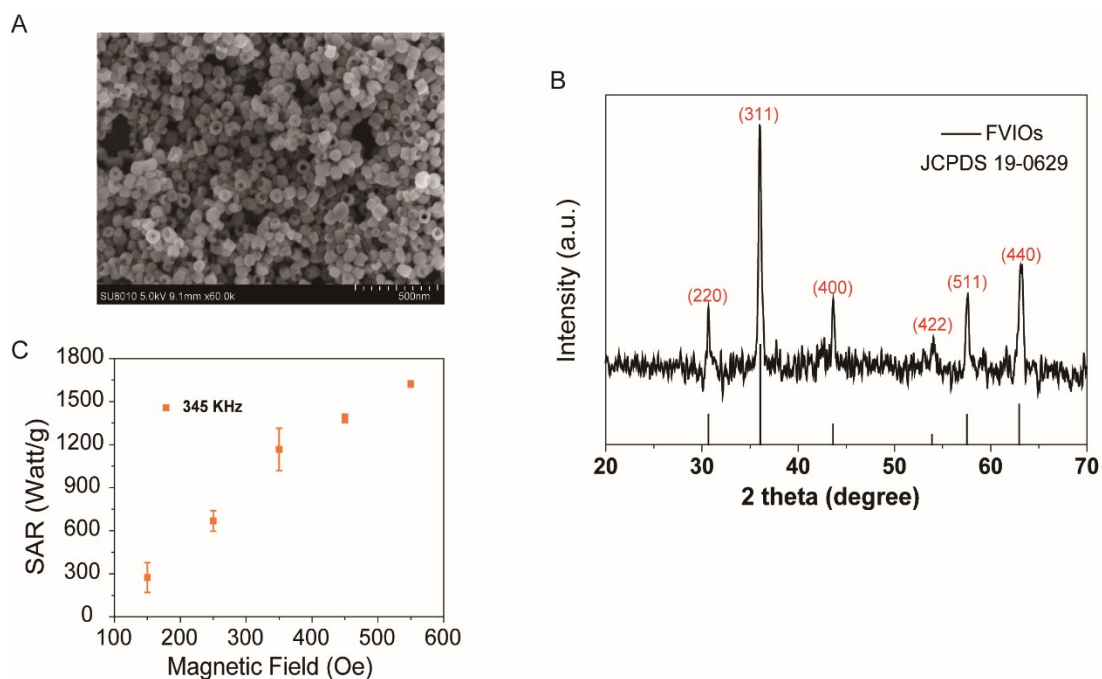


Supplementary Information



FigureS1. (A) Scanning Electron microscopy (SEM) image of FVIOs. (B) X-ray diffraction (XRD) spectra of FVIOs. (C) Specific Absorption Rate (SAR) of FVIOs (0.05 mg mL^{-1}) at different AMF.

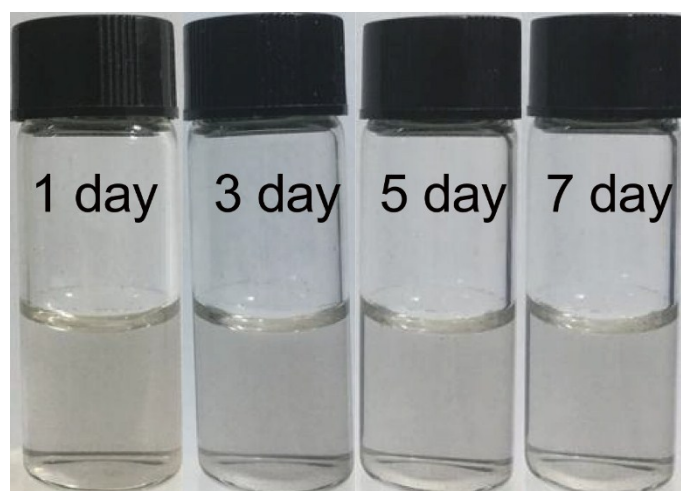


Figure S2. Stability of FVIO- β -Gal solution at 4 °C for 7 days.

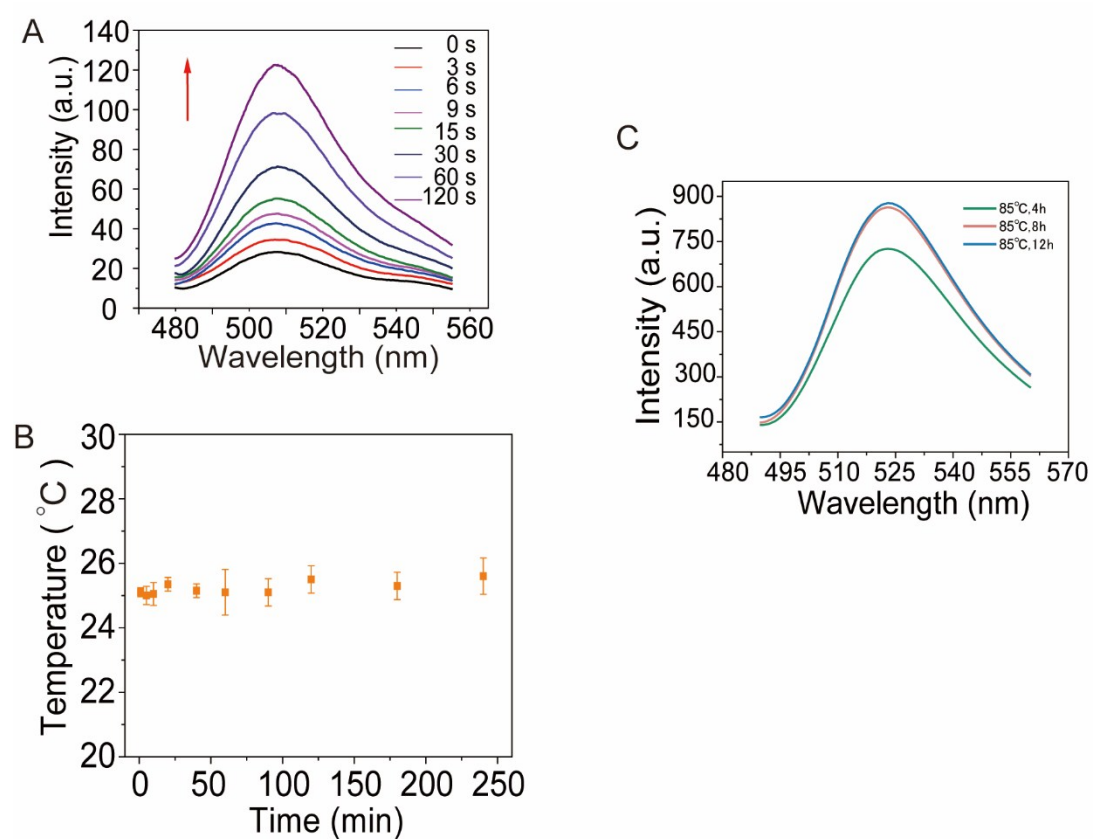


Figure S3. (A) Fluorescence spectra of cumulative release of FA molecules with AMF for different time periods. (B) The bulk temperature of solution during AMF exposure in Figure 3C, confirming the macroscopic temperature was maintained at 25 °C. (C) Fluorescence spectra of the supernatant of FA-azo-FVIO after incubation in 85 °C water bath for 4, 8 and 12 hours, showing maximum FA release after 12 hours at 85 °C.

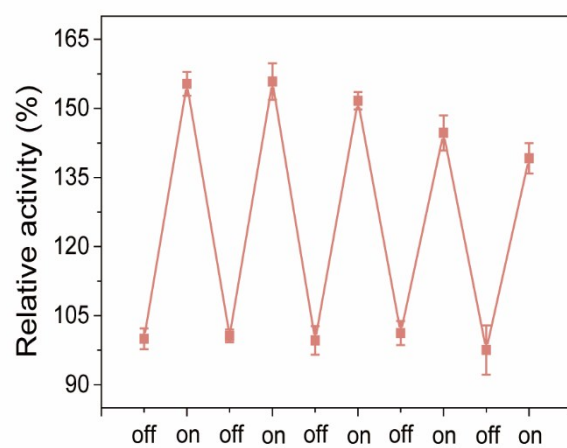


Figure S4. The reusability of FVIO-β-Gal by exposure to cycled AMF (550 Oe, 345 KHz, 1 min for each cycle).

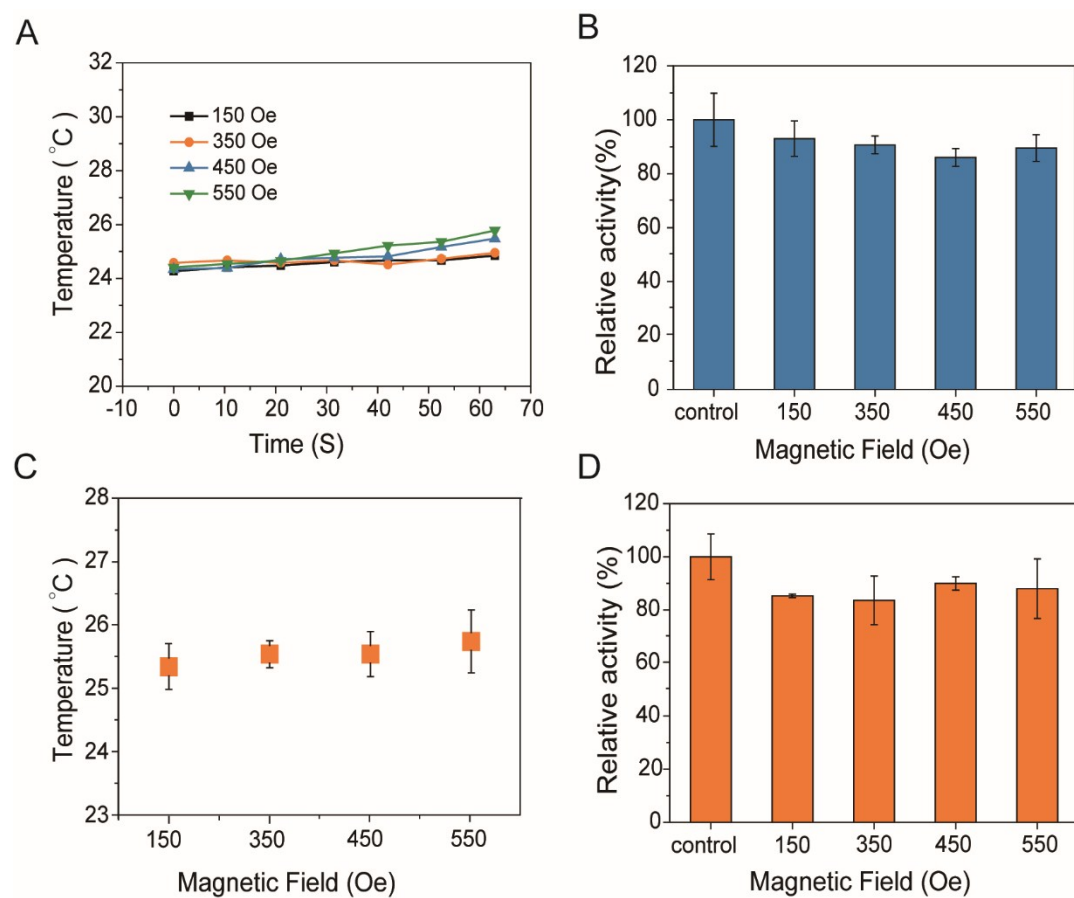


Figure S5. (A) The bulk temperature of the reaction solution for FVIOs-KPC under different AMF for 1 min, measured by using an optical temperature probe. (B) The relative activity of the physical mixture of KPC and FVIOs under different AMF. (C) The overall temperature of the reaction solution for FVIOs-GOx during applying different alternating magnetic fields for 15 min. (D) The relative activity of the physical mixture of GOx and FVIOs after exposure to different AMF for 15 min.