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Supplementary Information

Polymer-grafted superparamagnetic iron oxide nanoparticle as a potential stable system for magnetic resonance imaging and doxorubicin delivery

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Characterization and Equipment

^{1}H NMR and ^{19}F NMR (Agilent 400 MHz) were used for characterization of polymer and synthetic paths. ^{1}H NMR spectrum was recorded in $CDCl_3$ as solvent and TMS as internal standard. Fourier transform–infrared spectroscopy (FT-IR) (Perkin Elmer 2000) was used to characterize polymer-grafted SPIONs. FT-IR Spectra were recorded in the wavelength interval between 4000 and 450 nm^{-1}. To do IR measurement, all samples were ground and mixed with KBr and then pressed to form pellets. The molecular weights of the polymers were determined by gel permeation chromatography (GPC) using two serial Plgel 5 µm MIXED-D columns (polymer laboratories) with column temperature of 30 °C. THF was used as eluent with a flow rate of 1 ml. min^{-1}. Poly(ethylene glycols) of narrow and defined molecular weights were used as calibration standards. The average size and zeta potential of the nanoparticles were measured using DLS (Malvern ALV/CGS-3 Goniometer, Malvern Instruments, Malvern, UK) and Zetasizer (Zetasizer Nano, Malvern Instruments, USA). UV-visible transmittance spectra were recorded on a Varian Cary-100 Bio UV-Vis spectrophotometer. Transmission electron microscopy (TEM) images were taken using a Philips tecnai12 equipped with a Biotwin lens and a LaB6 filament, operated at 120kV accelerating voltage. Thermogravimetric analysis (TGA) was performed on a TGA Q50 (TA Instruments). Samples were heated at a rate of 20 °C per min under nitrogen blanket and the data were recorded from 20 to 600 °C. The weight loss was calculated from the difference between the weights measured at 25°C and at 600 °C. The chemical surface composition of modified SPIONs was determined using X-ray Photoelectron Spectroscopy (XPS)

(BesTec, Germany). The instrument was operated with monochromated Al-Ka radiation at 1486.60 eV. The magnetic properties of samples were measured in a vibrating sample magnetometer (VSM) (Meghnatis Daghigh Kavir Co, Iran) at room temperature. Powder X-ray diffraction (XRD) pattern for SPIONs was obtained with a Bruker D2 phaser diffractometer using Co Kα radiation (λ= 1.74 °A). The ranges of the diffraction angles (2θ) were from 10° to 80°.

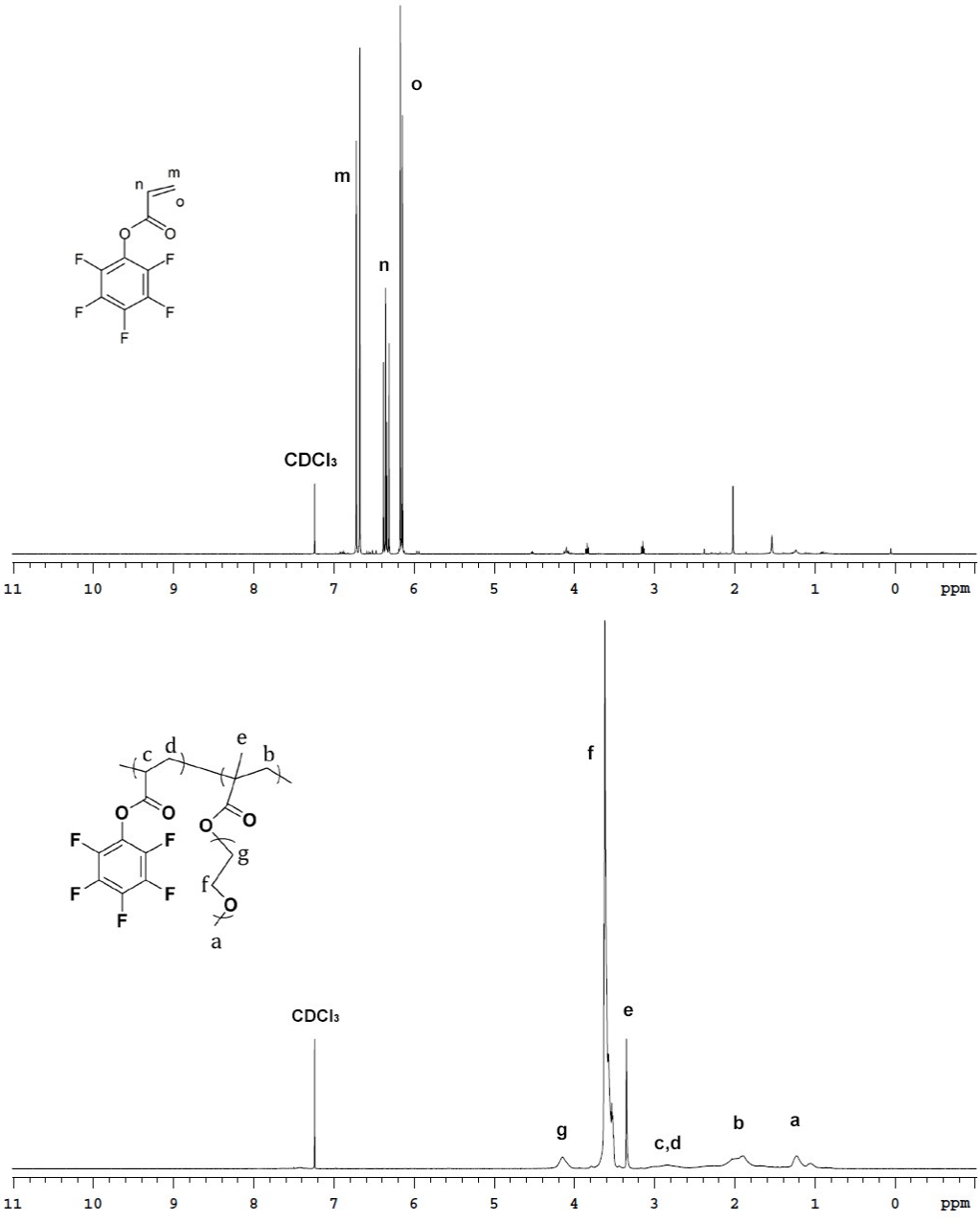

Figure S1. ^{1}H NMR spectra of PFPA and PPFPA-PEGMA copolymers. The spectra were taken in $CDCl_3$ using TMS as internal standard at room temperature

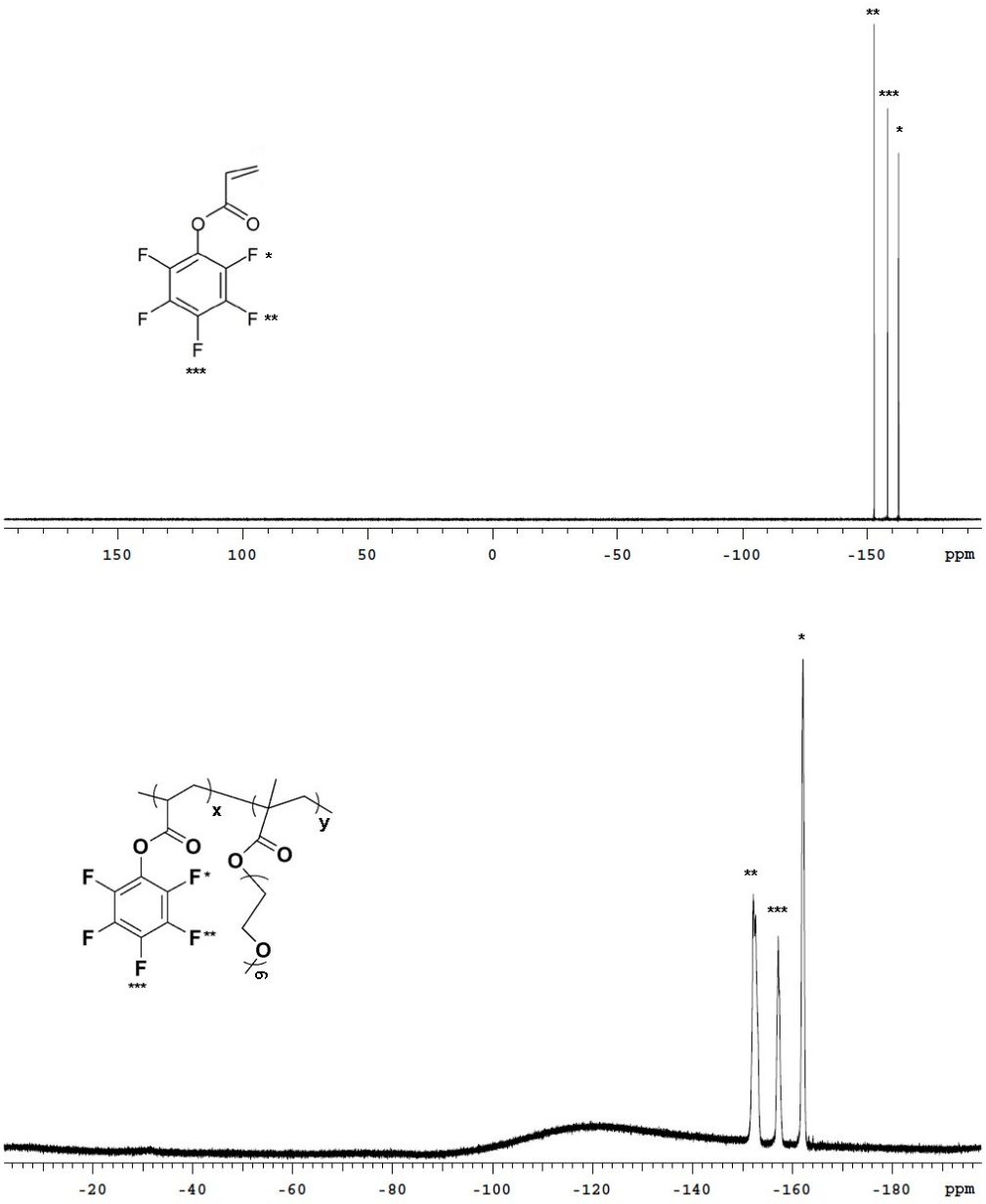

Figure S2. ^{1}F NMR spectra of PFPA and PPFPA-PEGMA copolymers. The spectra were taken in $CDCl_3$ at room temperature

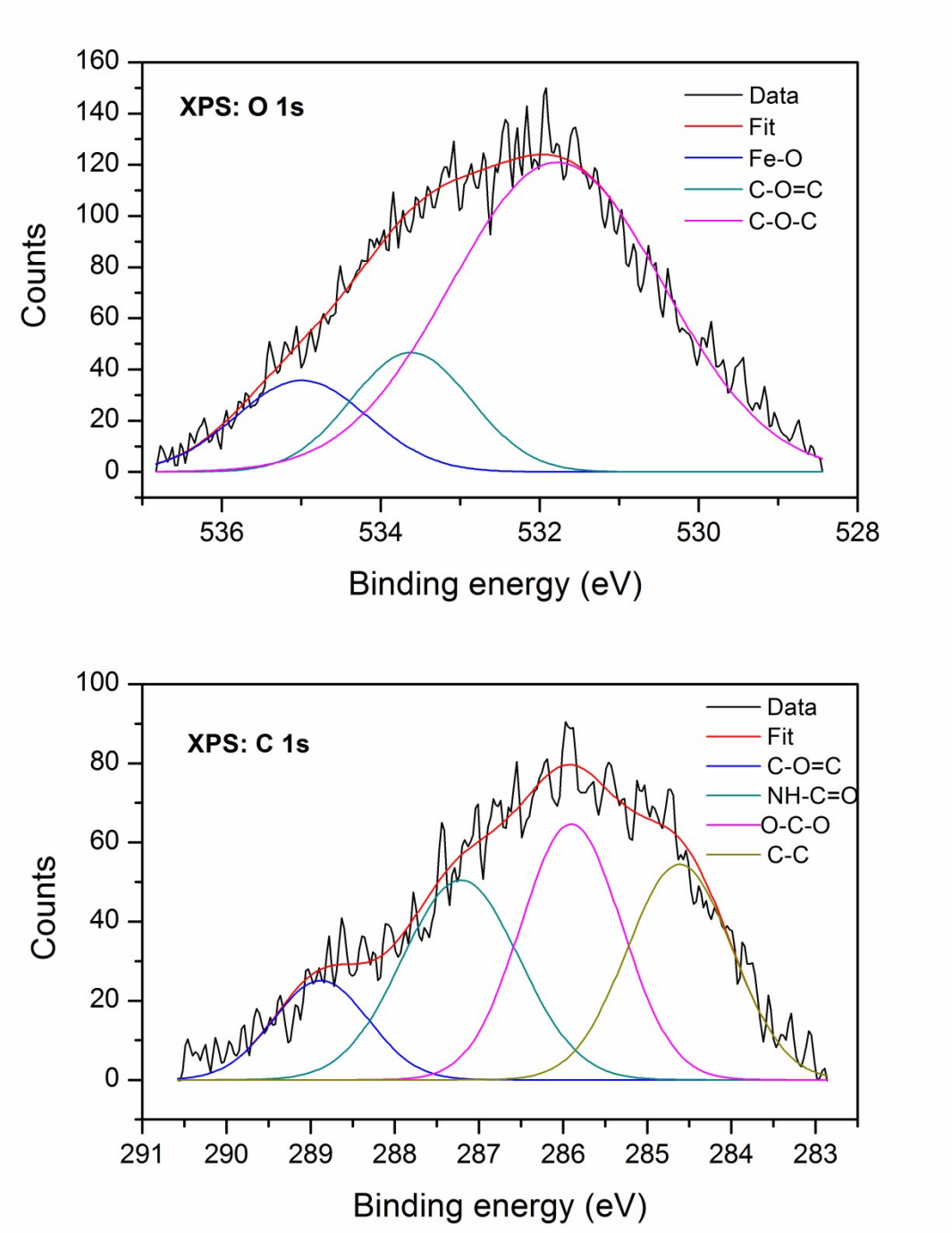

Figure S3. XPS spectra of polymer-grafting SPIONs showing the C1s and O1s peaks representing the chemical functionalities on the surface of SPIONs