

## Supporting information

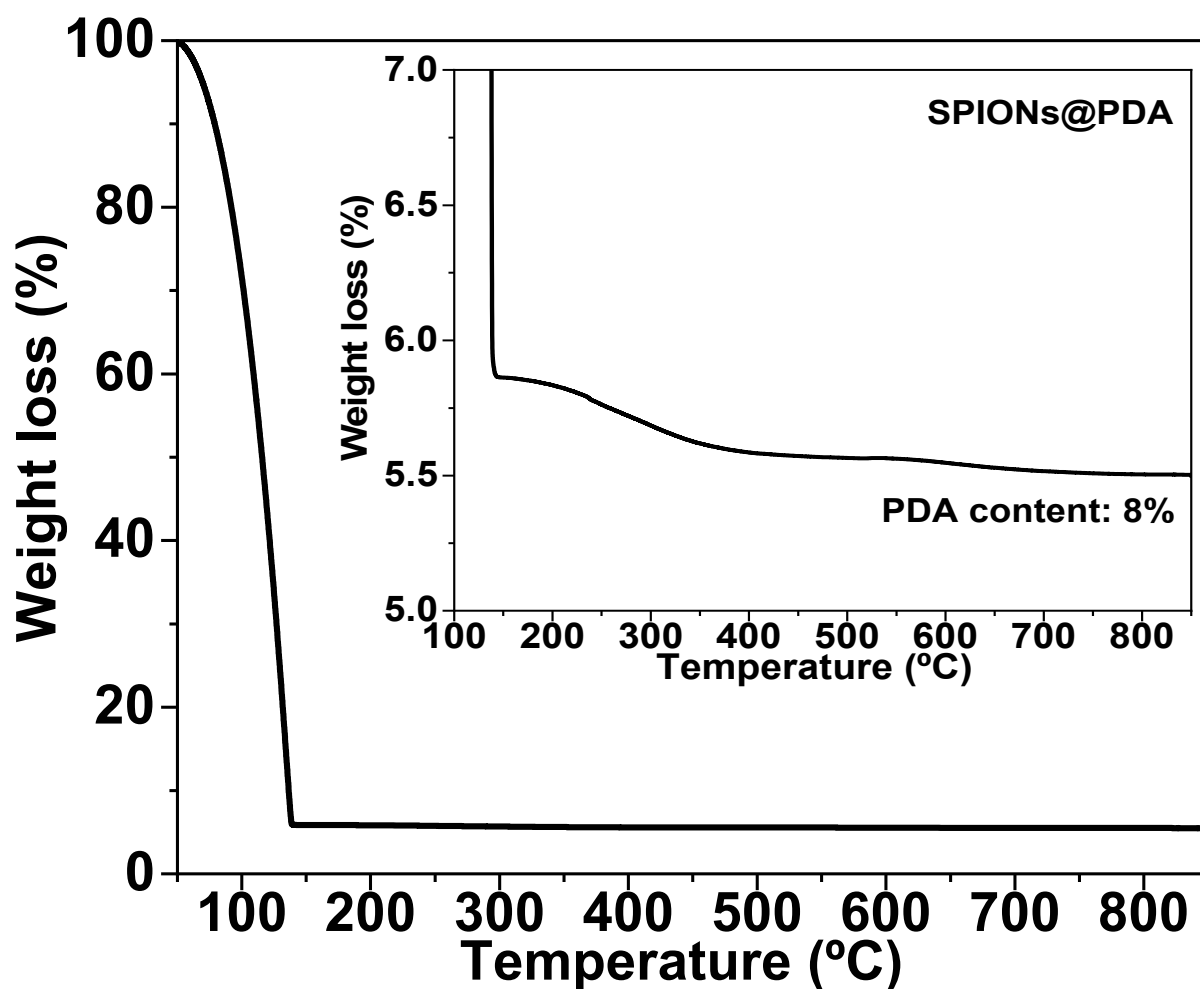
### Fluorescent Magnetic Mesoporous Nanoprobes for Biotechnological Enhancement Procedures in Gene Therapy

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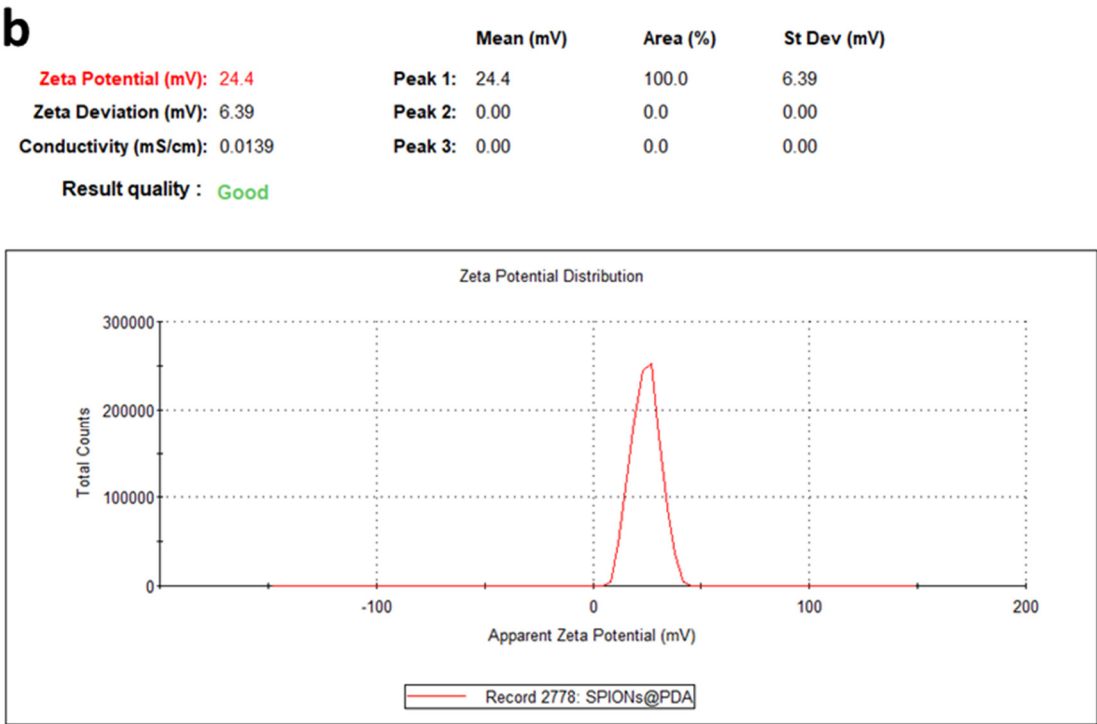
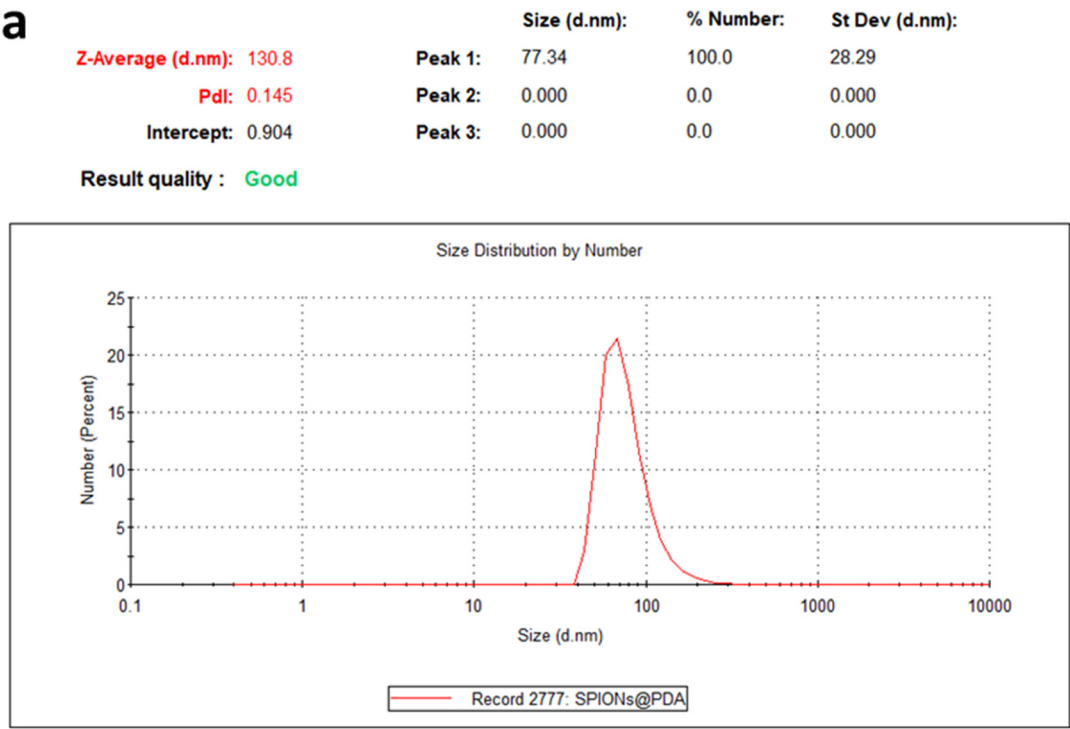
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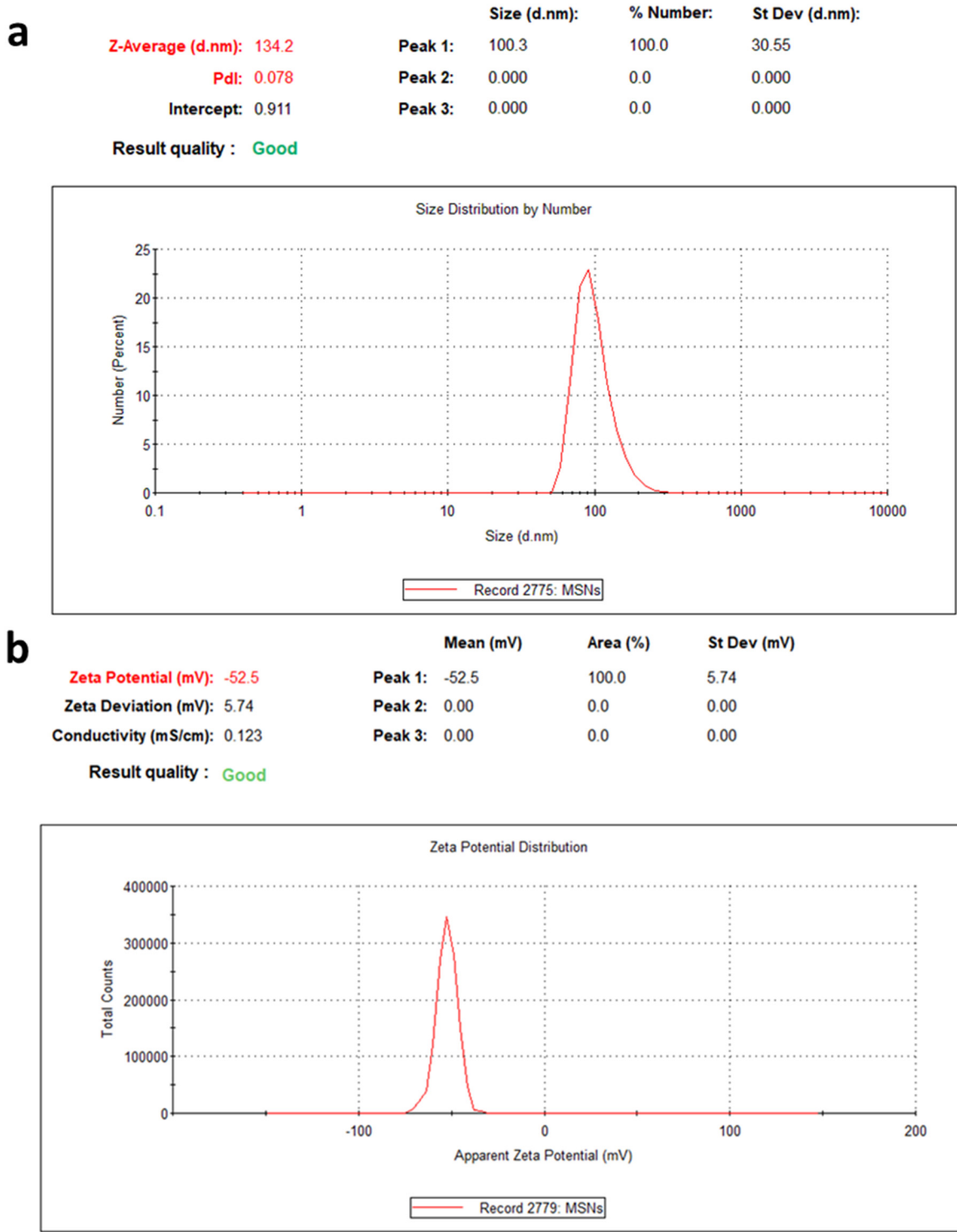


**Figure S1.** TGA thermogram of SPIONs@PDA. A two-stage thermal degradation process for PDA is observed in TGA curve of SPIONs@PDA. First weight loss stage (above 50°C) is related to the

evaporation of water molecules in the biopolymer matrix. The second weight loss occurs around 200 °C, which might correspond to the thermal oxidation and pyrolysis of the polymer. The residues remaining after pyrolysis are assumed to be the inorganic part of the nanostructures (Fe<sub>3</sub>O<sub>4</sub> nanoparticles).

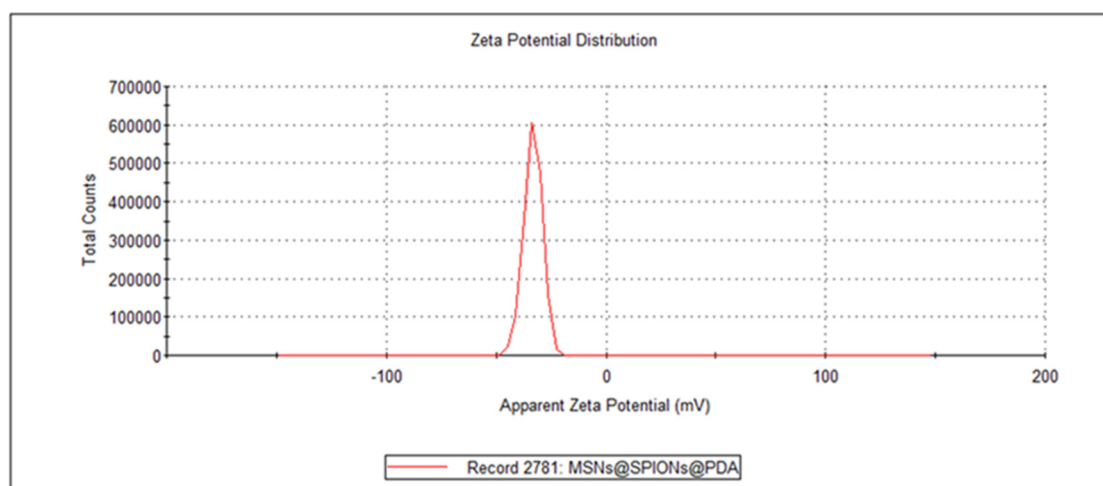
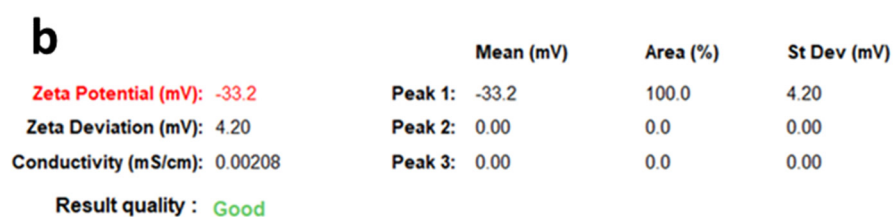
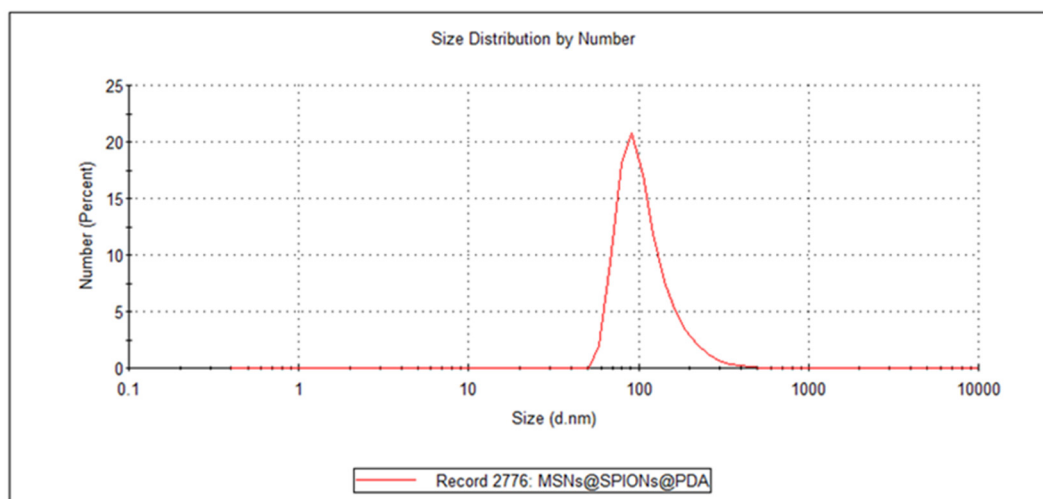
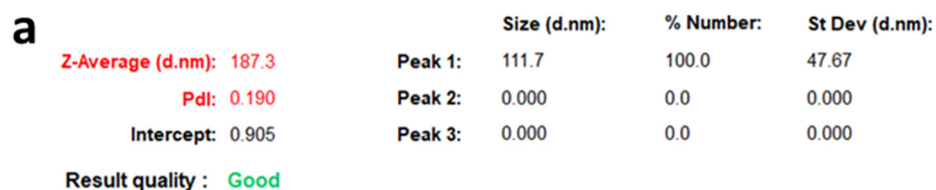


**Figure S2.** Dynamic Light Scattering measurements of SPIONs@PDA: Size Distributions by Number (a) and Zeta Potential Disributions (b).

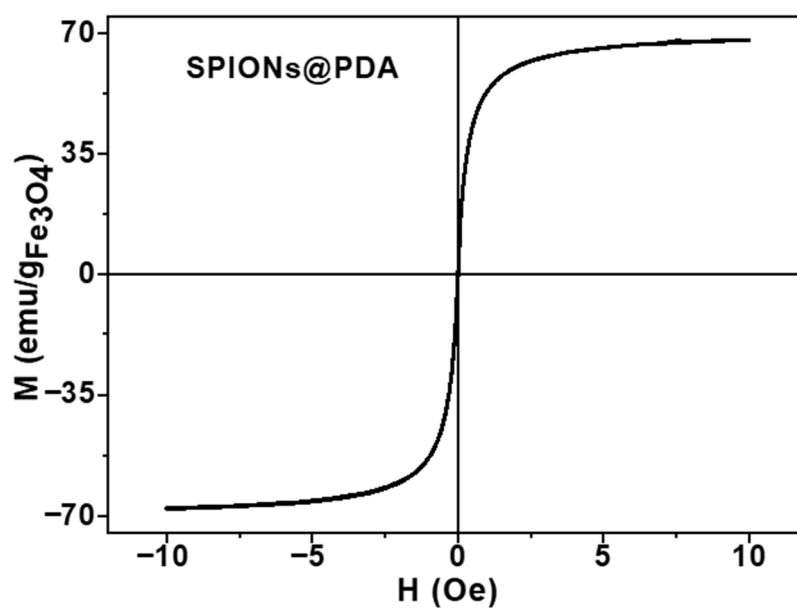


**Figure S3.** Dynamic Light Scattering measurements of MSNs: Size Distributions by Number (a) and Zeta Potential Disributions (b).





**Figure S4.** Dynamic Light Scattering measurements of MSNs@SPIONs@PDA: Size Distributions by Number (a) and Zeta Potential Disributions (b).



**Figure S5.** Hysteresis loops measured on SPIONs@PDA at room temperature.

At room temperature, SPIONs@PDA exhibited negligible coercive fields ( $H_c = 2.5$  Oe) and remanence ( $M_R = 0.4$   $\text{emu/gFe}_3\text{O}_4$ ), indicating a superparamagnetic behavior. Furthermore, the MNPs had a saturation magnetization of  $67.8$   $\text{emu/gFe}_3\text{O}_4$ .