

Supporting Information

Novel Polymeric Injectable Fluorescent Drug Delivery Nanoparticles: A Proof-of-concept Study for Intervertebral Disc Application

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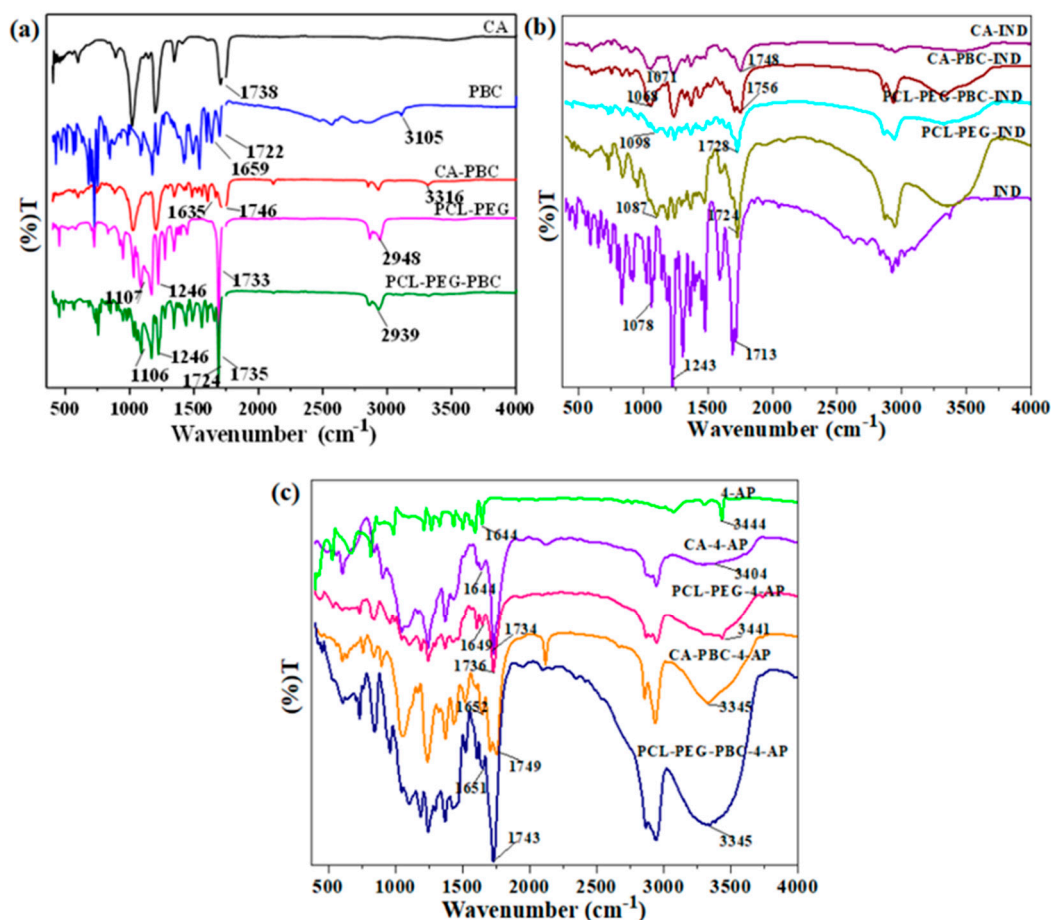


Figure S1. (a) FTIR spectroscopy of PBC, CA, CA-PBC, PCL-PEG, and PCL-PEG-PBC; (b) IND, CA-IND, CA-PBC-IND, PCL-PEG-IND, and PCL-PEG-PBC-IND; and (c) 4-AP, CA-4-AP, CA-PBC-4-AP, PCL-PEG-4-AP, and PCL-PEG-PBC-4-AP. CA, cellulose acetate; PCL, polycaprolactone; PEG, polyethylene glycol; 4-AP, 4-aminopyridine. Characteristic stretching PBC dye has characteristic bands at 1722 cm⁻¹ for -C=O stretching and amide at 1659 cm⁻¹ confirms the dye formation. The characteristic PBC-conjugated CA and PCL-PEG showed -C=O stretching shift from 1738 cm⁻¹ to 1746 cm⁻¹ and 3538 cm⁻¹ confirming the formation of dye conjugation. The shifting of the distinct peaks of carbonyl (-C=O) stretching 1713 cm⁻¹ of the IND to 1748 cm⁻¹, and 4-AP of NH₂ stretching 1644 cm⁻¹ shifted to 1646 cm⁻¹ indicates the drug interaction with nanoparticles.

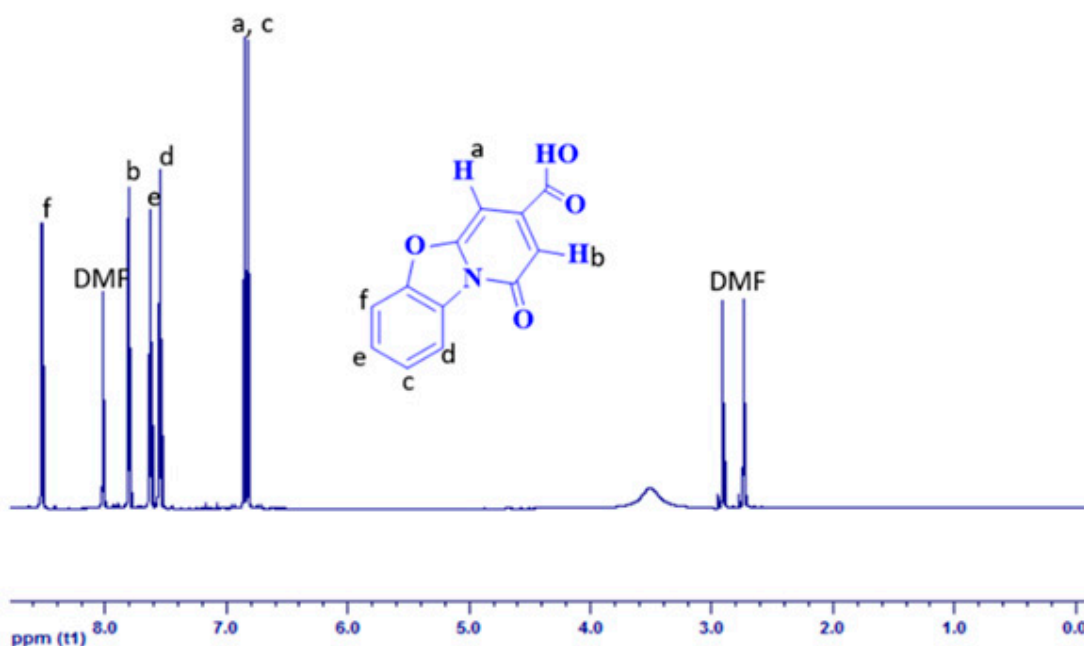


Figure S2. Structure characterization of synthesized copolymers by ^1H NMR for PBC dissolved in DMF as the solvent. The peaks of PBC at 8.01 and 6.82 ppm designated as a and b belong to $-\text{CH}-$ of the 6-membered ring, and it confirms the incorporation of citric acid into the 2-aminophenol compound.

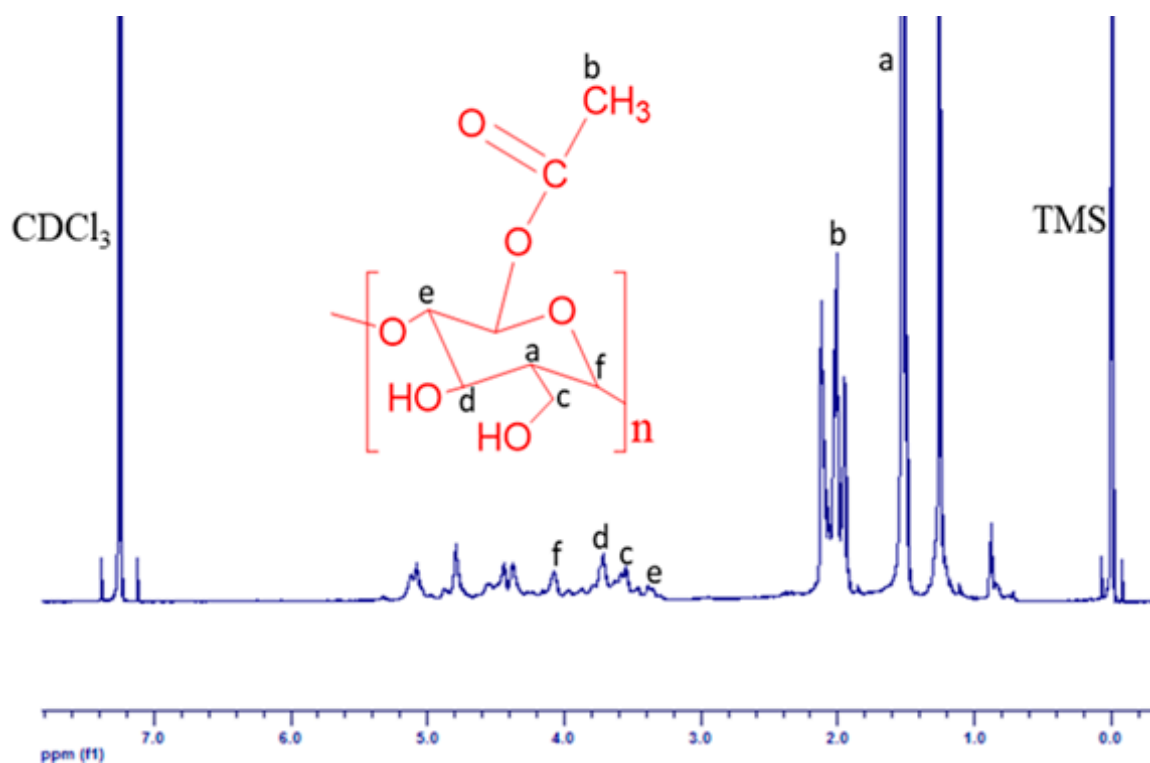


Figure S3. Structure characterization of synthesized copolymers by ^1H NMR for CA dissolved in CDCl_3 as the solvent.

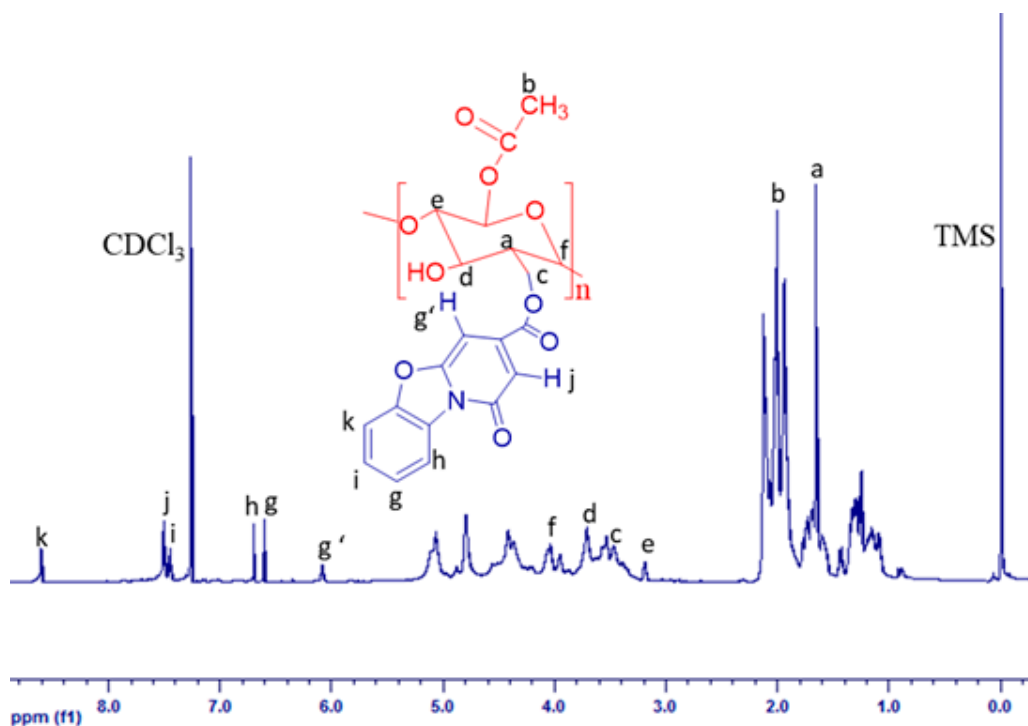


Figure S4. Structure characterization of synthesized copolymers by ^1H NMR for CA-PBC dissolved in CDCl_3 as the solvent. The peaks of PBC in d,e, and f with δ values at 3.37 ppm, 3.72 ppm, and 4.02 ppm are of the CA backbone confirming the formation of CA-PBC. Also, the appearance of the PBC benzene ring at δ values of 6.61 ppm, 6.70 ppm, 7.42 ppm, and 8.63 ppm (g,h, i,k) confirms PBC conjugation to CA.

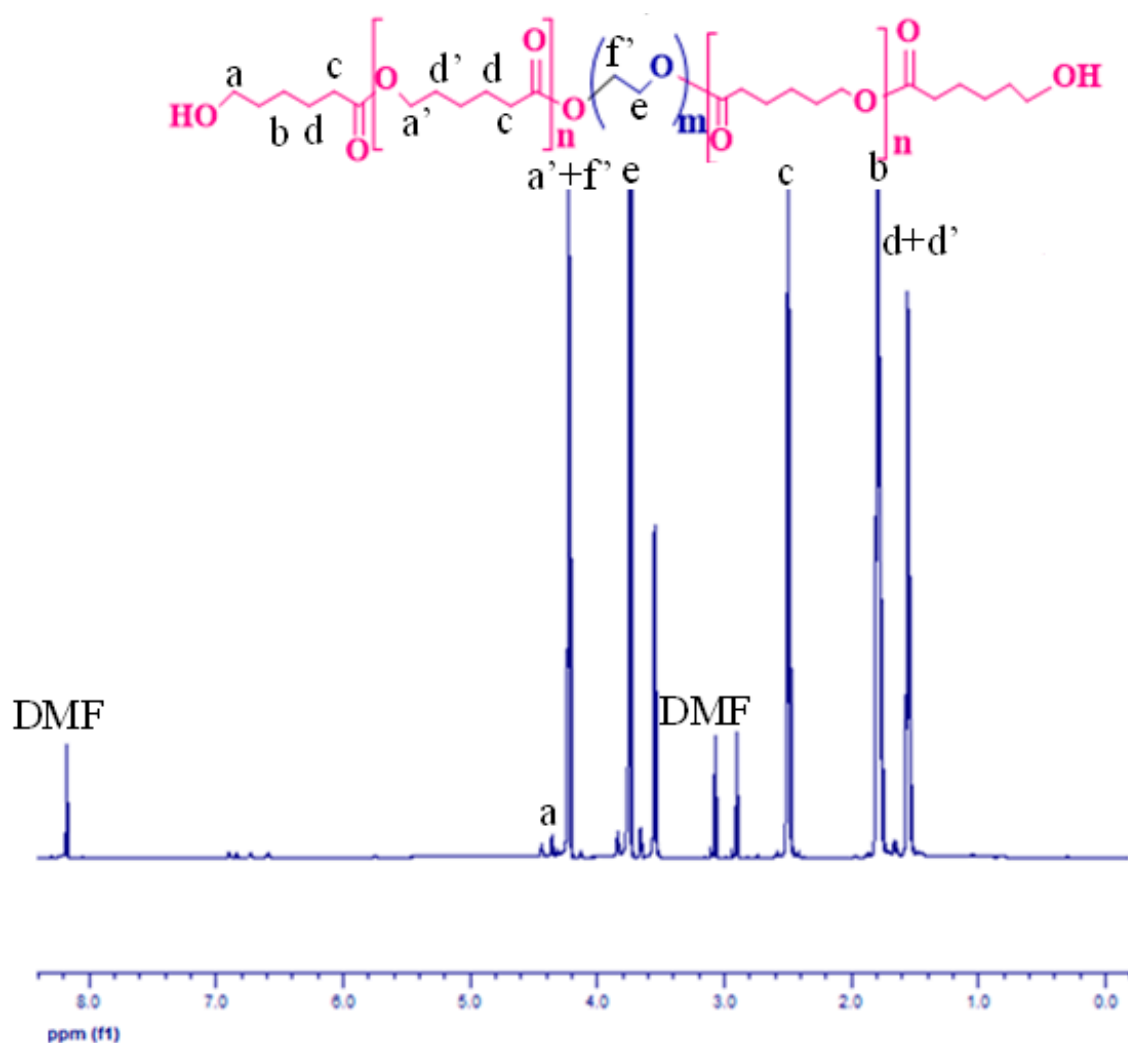


Figure S5. Structure characterization of synthesized copolymers by ^1H NMR for PCL-PEG dissolved in DMF as the solvent. The $-\text{CH}_2$ proton of the PEG at 3.64 ppm (b) and the $-\text{CH}_2\text{OOC}$ of PCL at 4.13 (a') confirms the formation of the copolymer of PCL-PEG.

Figure S6. Structure characterization of synthesized copolymers by ^1H NMR for PCL-PEG-PBC dissolved in DMF as solvent. The characteristic peaks of PBC benzene (g, h, i, k) and $-\text{CH}$ (g', j) of a 6-member ring, confirm the formation of PCL-PEG-PBC.

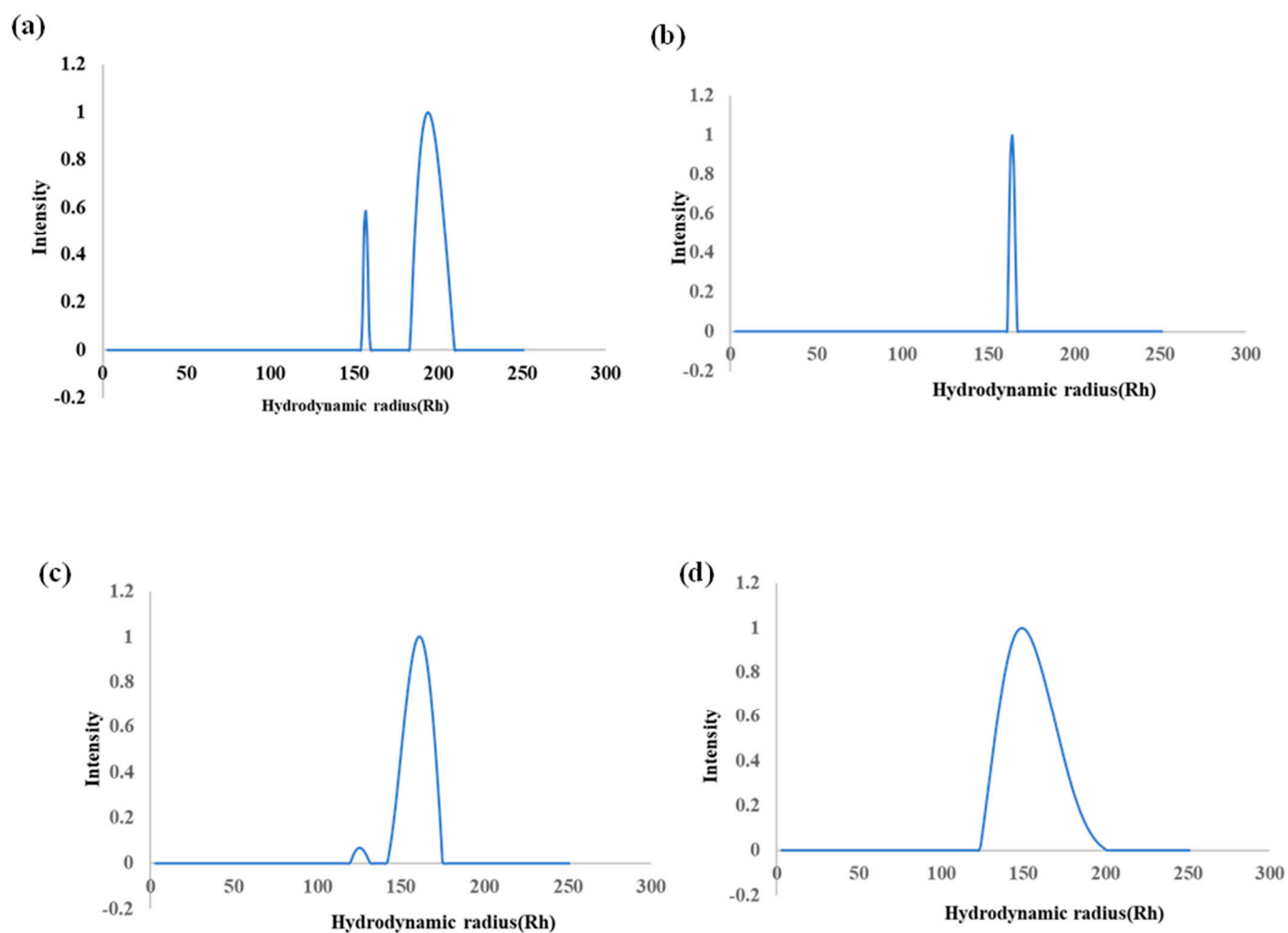


Figure S7. Particle size distribution images of (a) CA, (b) CA-PBC, (c) PCL-PEG, and (d) PCL-PEG-PBC.

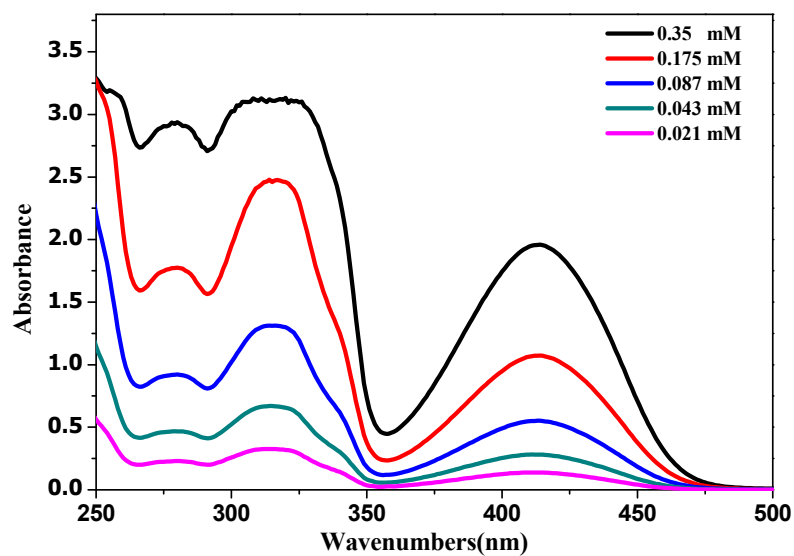


Figure S8. UV-Vis absorption spectra for PBC obtained from different concentrations(mM).

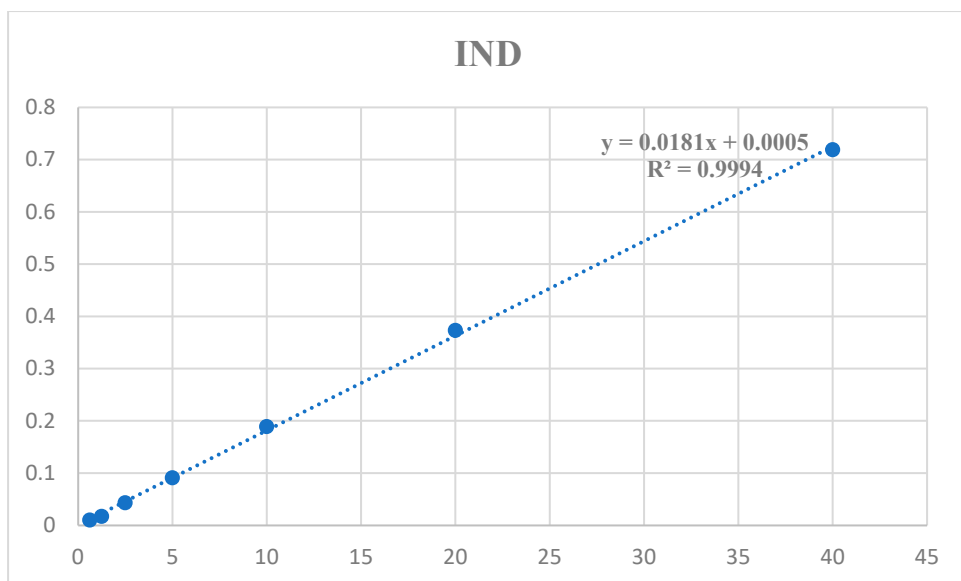


Figure S9. Standard curve for IND obtained from UV-Vis absorption spectra.

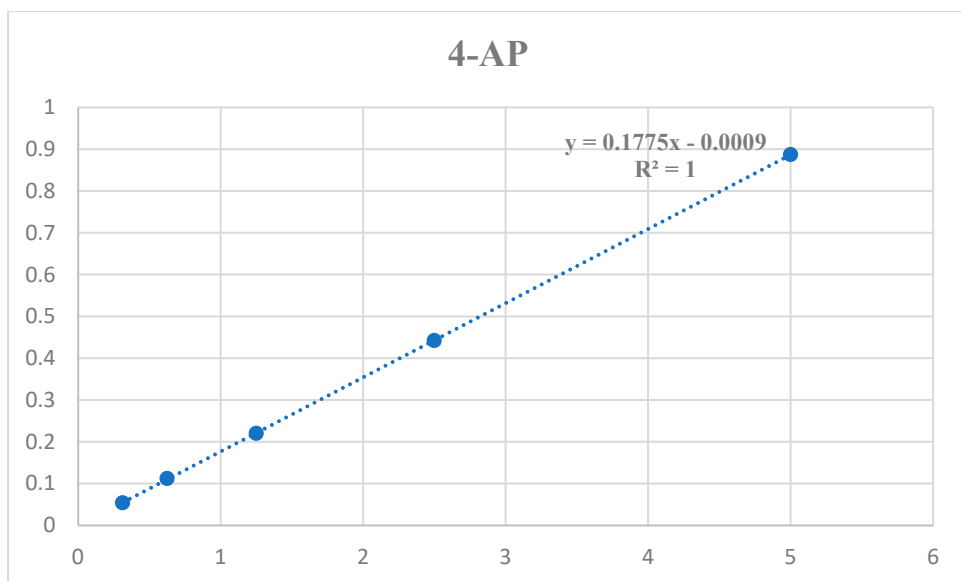


Figure S10. Standard curve for 4-AP obtained from UV-Vis absorption spectra.