Supporting Information

Magnetizing Cellulose Fibres with $CoFe_2O_4$ Nanoparticles for Smart Wound Dressing for Healing Monitoring Capability

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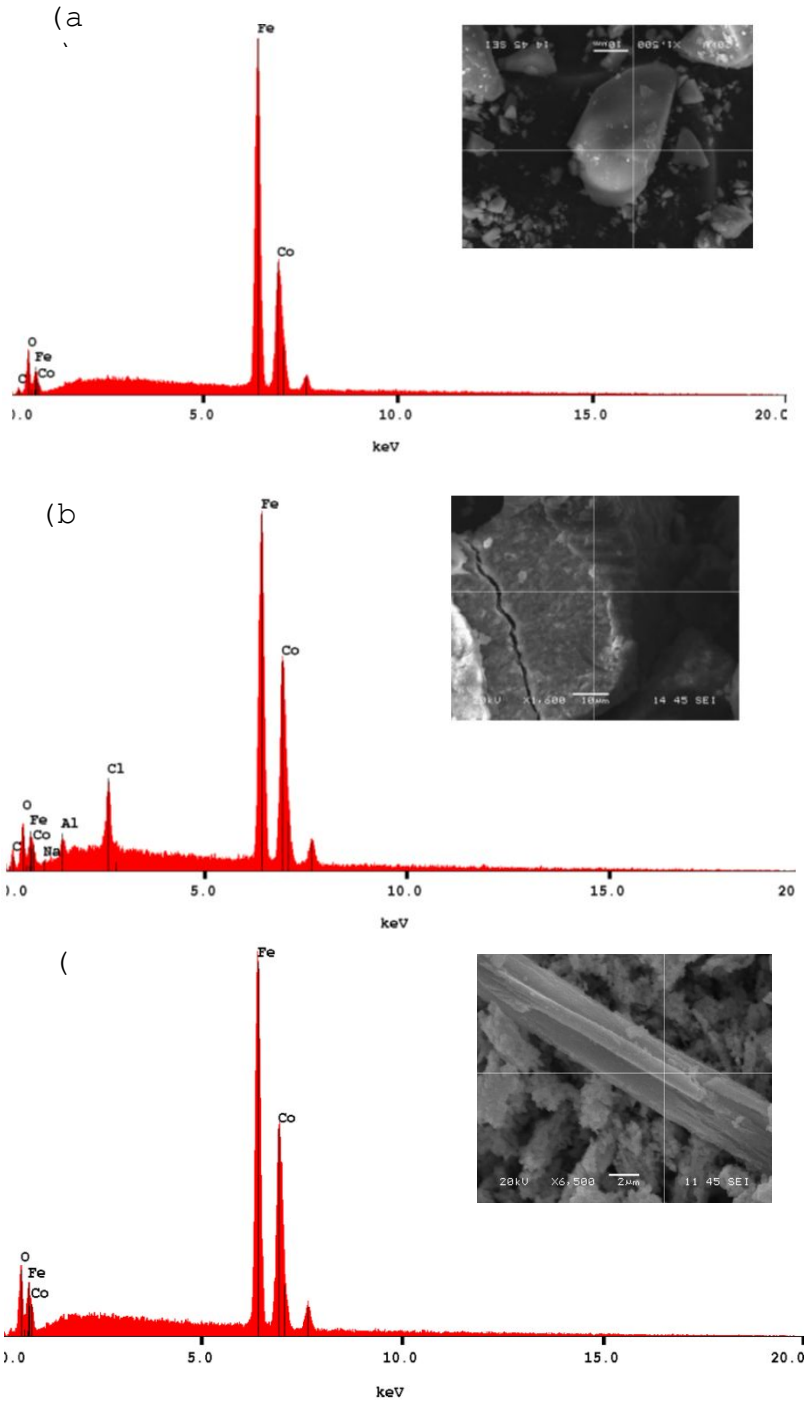


Figure S1. EDS spectra on spots in the inserted SEM image of the $CoFe_2O_4$ nanomagnets: (a) produced with Protocol A, showing a quantification ratio of Fe: Co ~ 2:1; (b) produced with Protocol B nanoparticle showing a quantification ratio of Fe:Co ~1.5:1; and

(c) produced with Protocol C, showing a quantification ratio of Fe:Co ~1.8:1

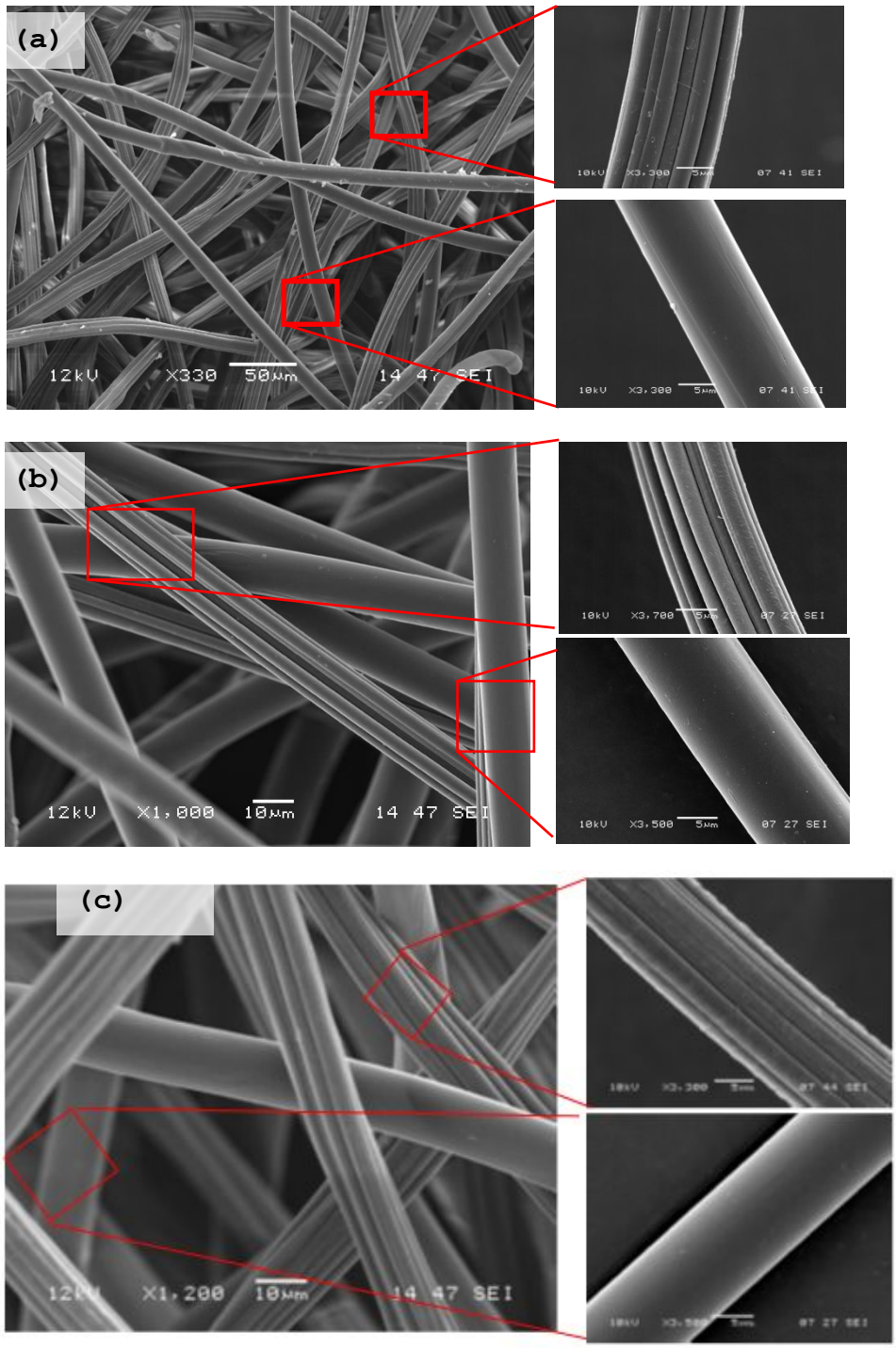
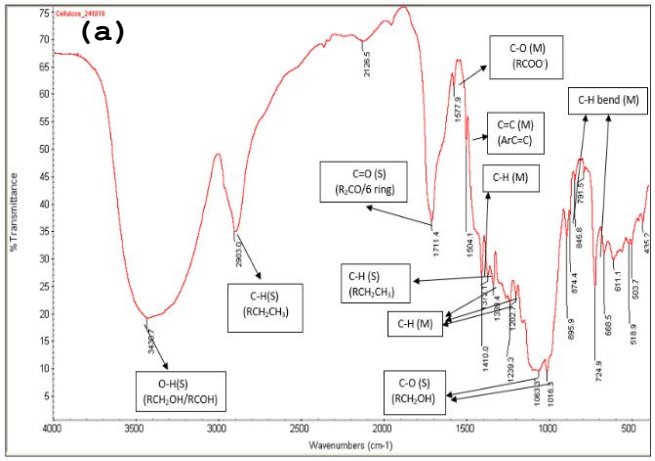
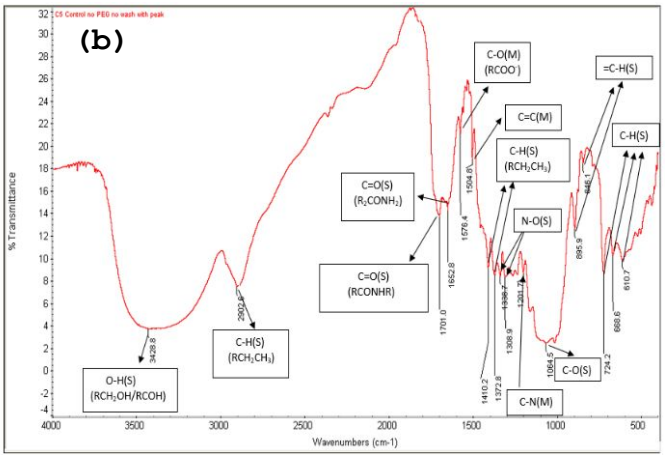
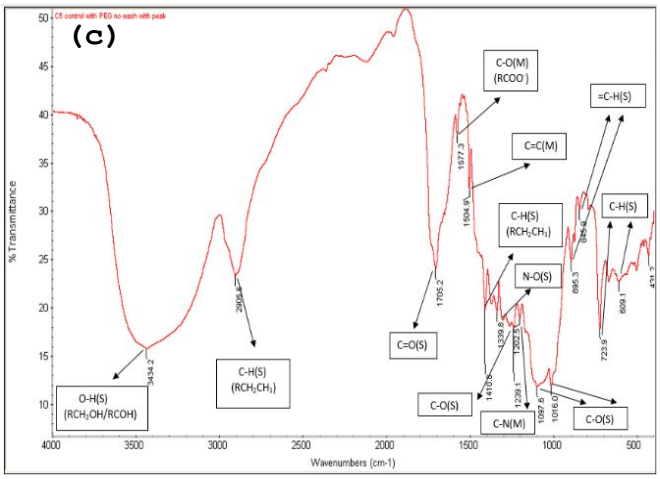


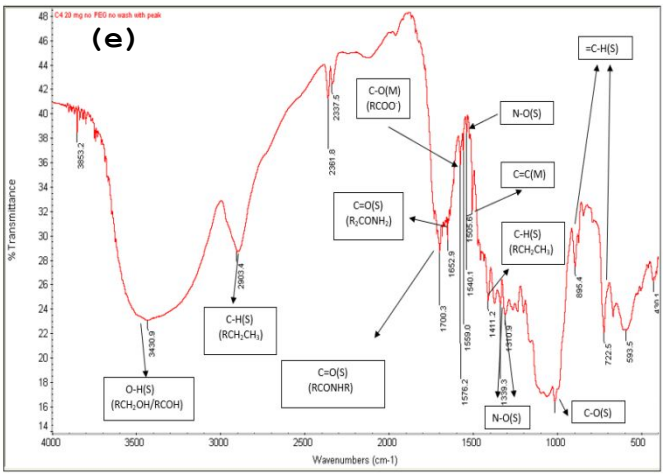
Figure S2. SEM images of cellulose fibres from Cite Curad wound dressing material (a) before functionalization and (b) after functionalization with branched polyethyleneimine b-PEI (c) after functionalized and rinsed with PEG, showing two types of fibre

arrangements in the cellulose and how the morphological and topographical differ before and after functionalization.









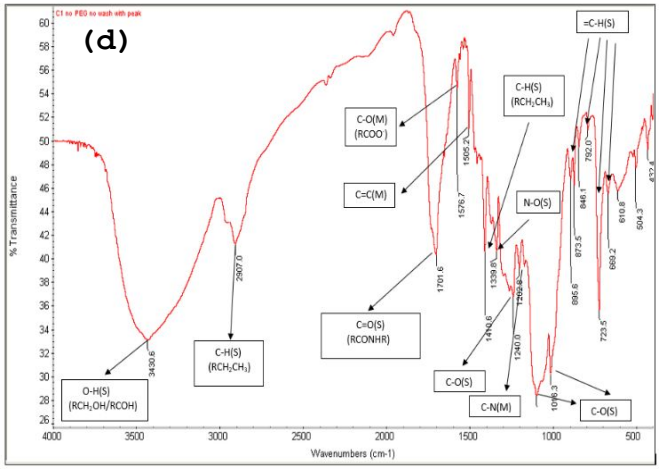


Figure S3. FTIR spectra labeled for type of vibration for (a) cellulose (b) functionalized cellulose (c) functionalized cellulose + PEG wash (d) functionalized cellulose + 5 mg/mL $CoFe_2O_4$ nanoparticles (e) functionalized cellulose + 20 mg/mL $CoFe_2O_4$

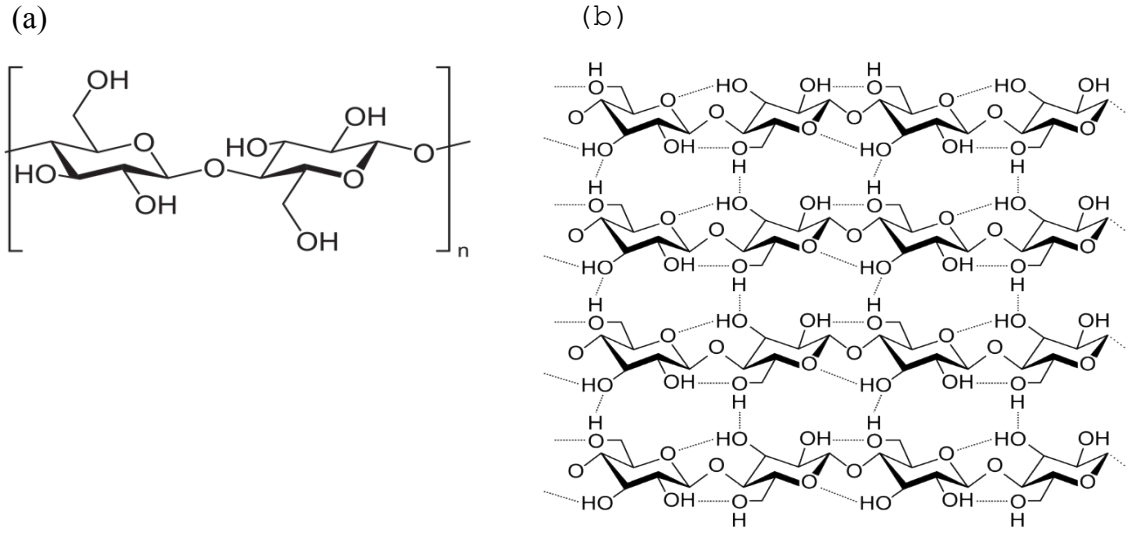


Figure S4. (a) a linear polymer of D-glucose units (two are shown) linked by β(1→4)-glycosidic bonds (b) Quadruple strands of a linear polymer of D-glucose showing the hydrogen bonds between glucose strands in cellulose fibre.

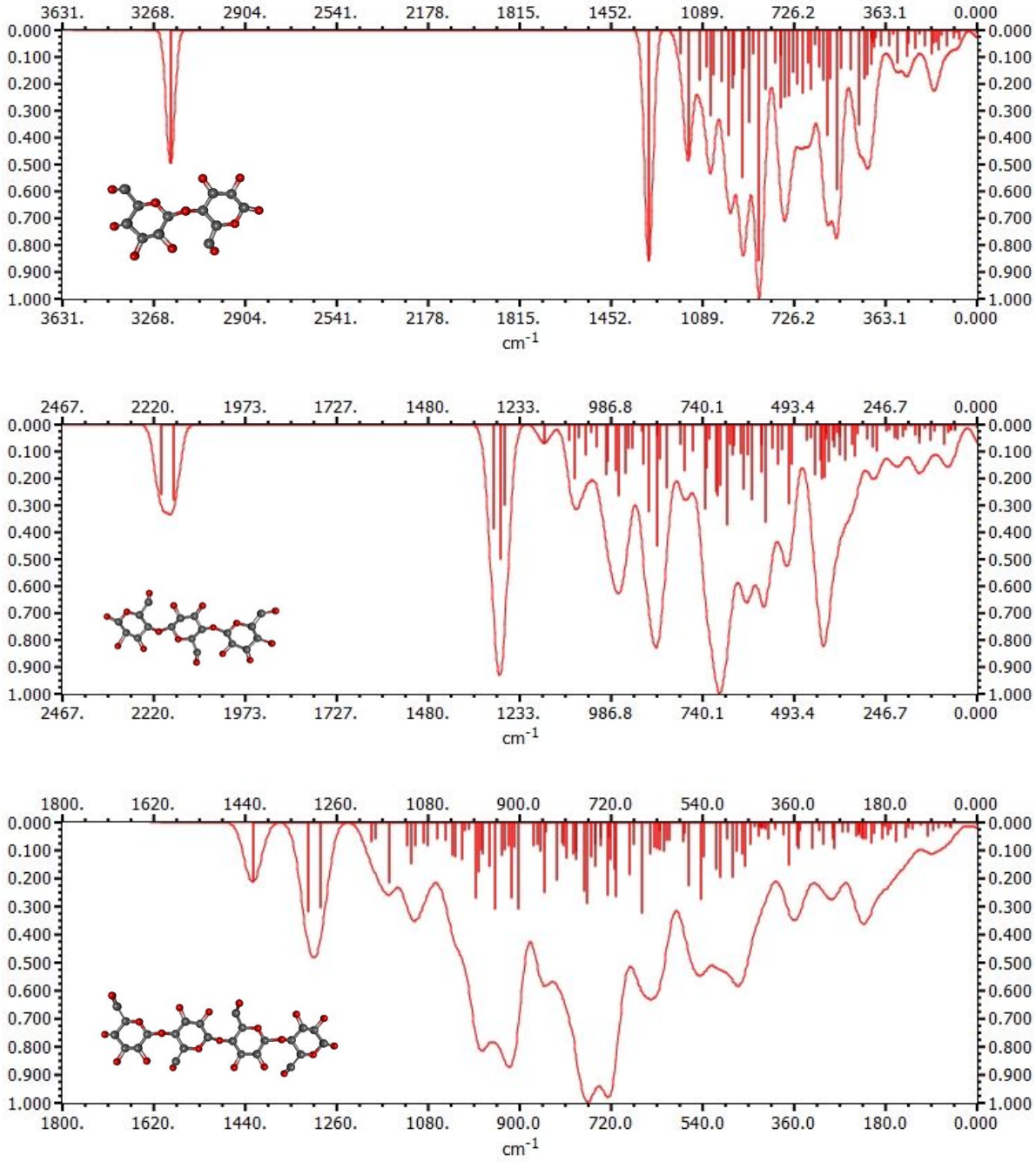


Figure S5. The IR models for single strand cellulose showing the change of the spectra pattern with increasing the number of rings.

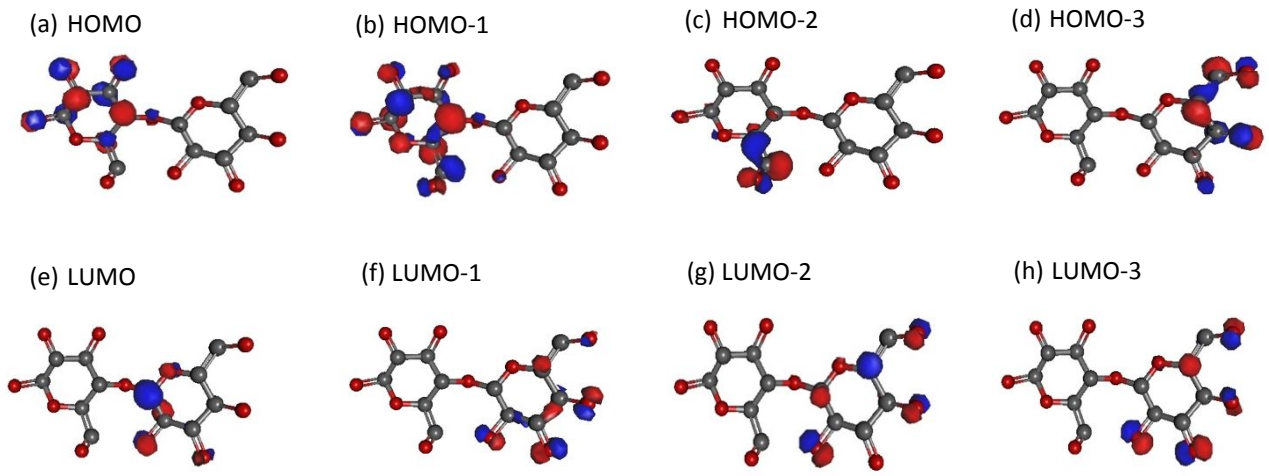


Figure S6. Thermochemical calculation of first excited state of cellubois (Alpha Orbitals), showing (a) the initial HOMO electronic orbital, (b) the 1st changes in HOMO electronic orbital, (c) the 2nd changes in HOMO electronic orbital, (d) the 3rd changes in HOMO electronic orbital (e) the initial LUMO orbital, (f) 1st change in the LUMO orbital, (g) 2nd change in the LUMO orbital, (h) 3rd change in the LUMO orbital