

Supporting Information



Figure S1. Example of “cotton ball” achieved after freeze-drying of electrospun cellulose fibers. The fibers appear the same for each sample, but the density is quite different for each sample owing to the Mg(OH)_2 NPs.

Table S1. Density of electrospun fibers after freeze-drying.

Sample	Volume of fiber mass	Mass	Density
Cellulose	4.2 cm^3	30.0 mg	7.2 mg/ cm^3
Cellulose and Mg(OH)_2	5.0 cm^3	65.2 mg	13.2 mg/ cm^3
Cellulose coated with Mg(OH)_2	5.7 cm^3	96.7 mg	17.0 mg/ cm^3

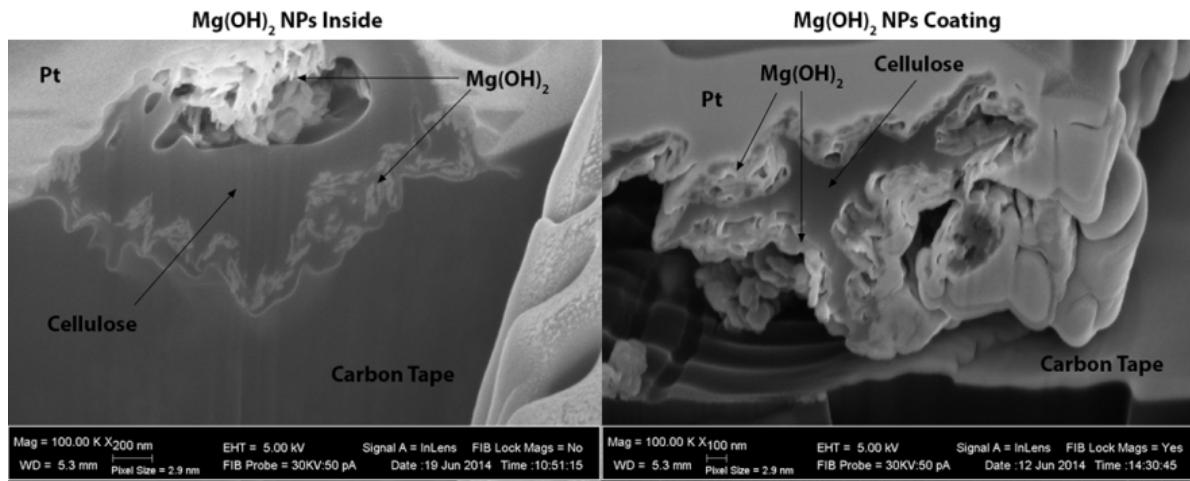


Figure S2. SEM images for fibers with NPs both inside (left) and coated (right). The fibers were mounted on carbon tape and then sputtered with platinum, then milled with a focused ion beam of gallium ions. The resultant cross-sections show that the presence of NPs inside the fibers generate large voids in the fibers. Additionally, it can be seen that some of the NPs seem to migrate to just below the surface. The NP coated fiber studied appears puckered, possibly during the freeze-drying step. The coated fiber shows no internal voids and uniform coating of NPs on the surface, approximately 100 nm thick.

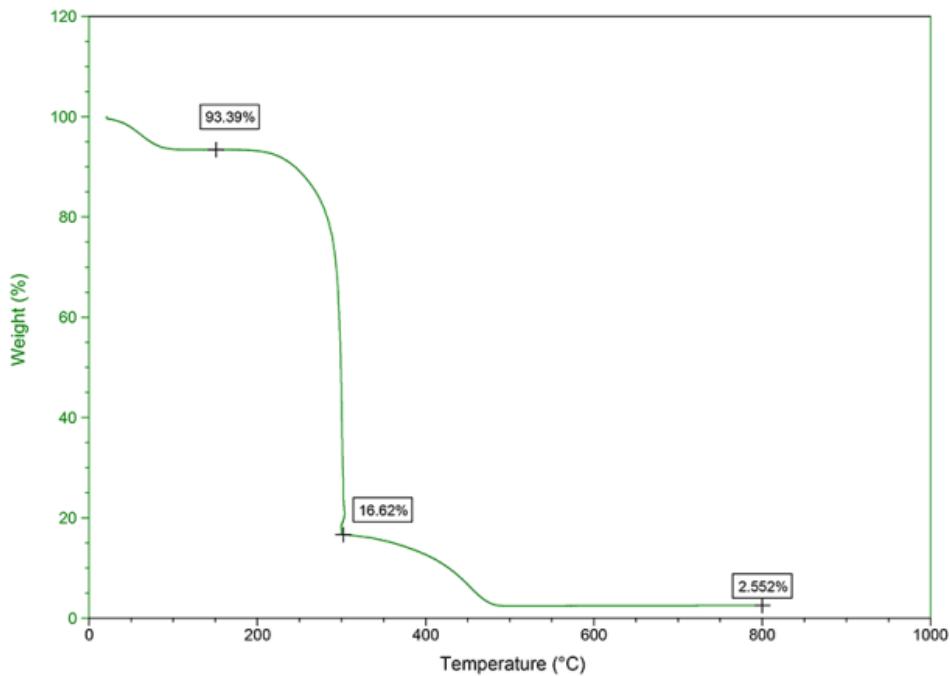


Figure S3. TGA of cellulose fibers performed at 1°C/min, remaining isothermal for 30 min at 300°C, and then again ramping up to 800°C at 1°C/min. This illustrates the two stage thermal degradation of cellulose: combustion and smoldering.

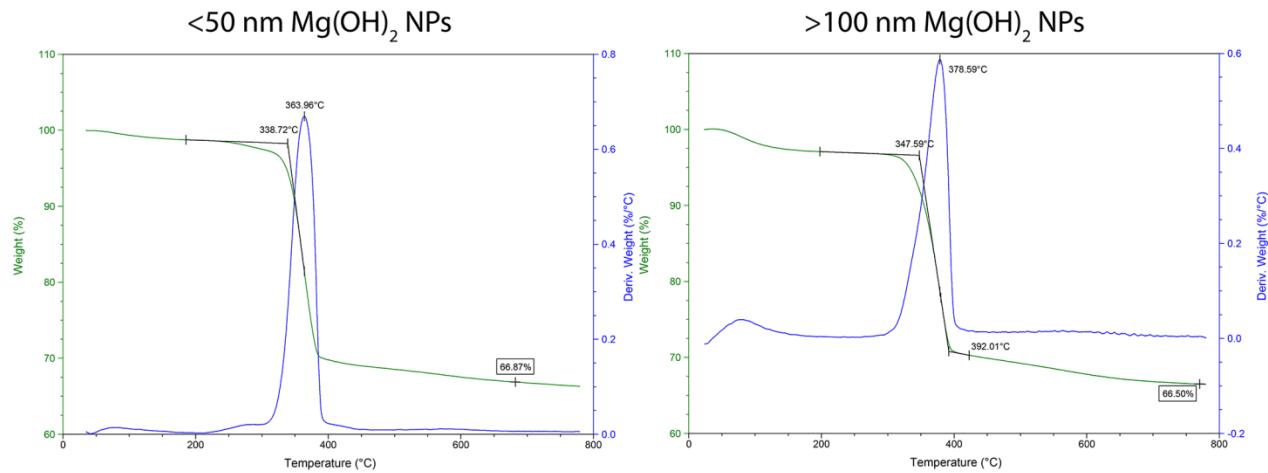


Figure S4. TGA of the Mg(OH)₂ NPs shows that the smaller NPs thermally decompose at a lower temperature than the larger NPs, both leaving approximately the same residual MgO mass.