

Supplementary Information:

Enhanced Osteogenesis of Mesenchymal Stem Cells on Electrospun Cellulose Nanocrystals/Poly(ϵ -caprolactone) Nanofibers on Graphene Oxide Substrates

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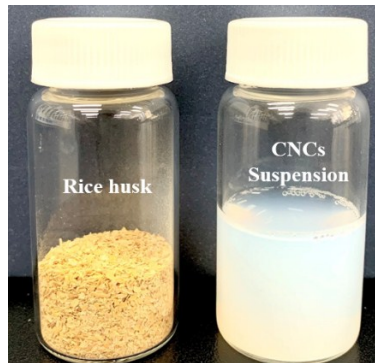
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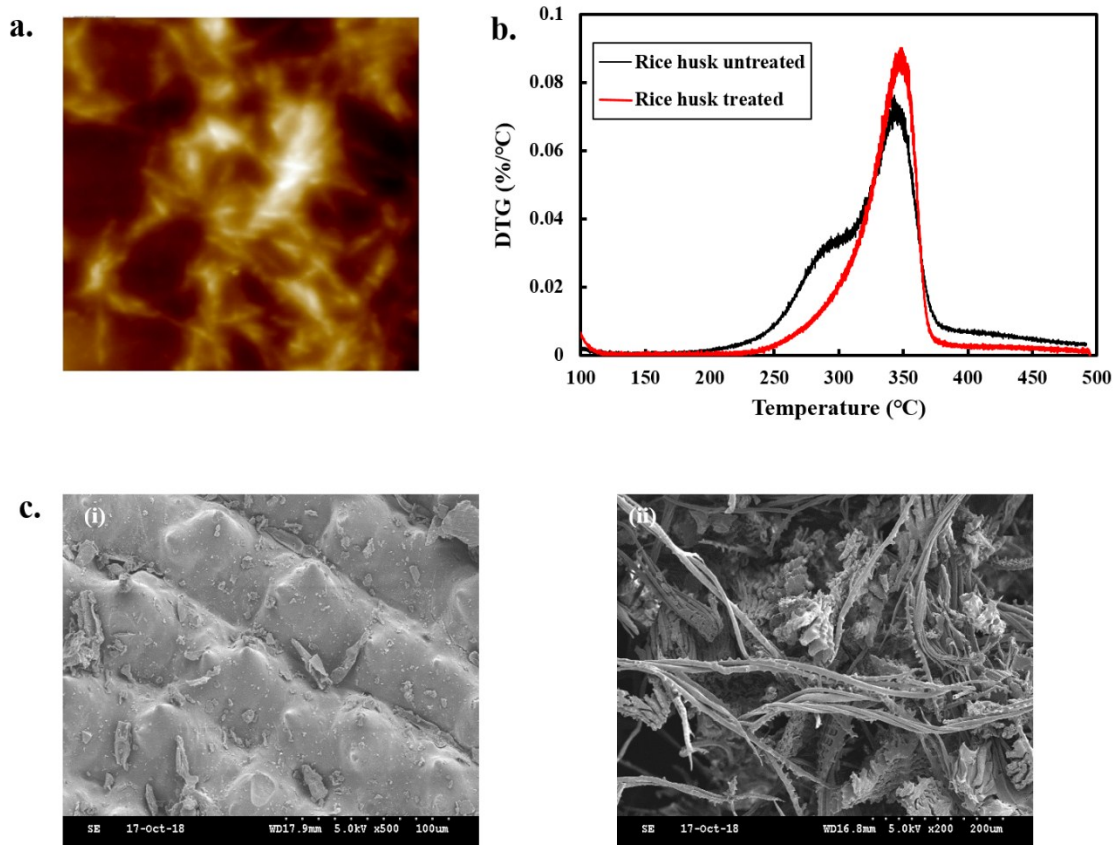
⁺equivalent authors

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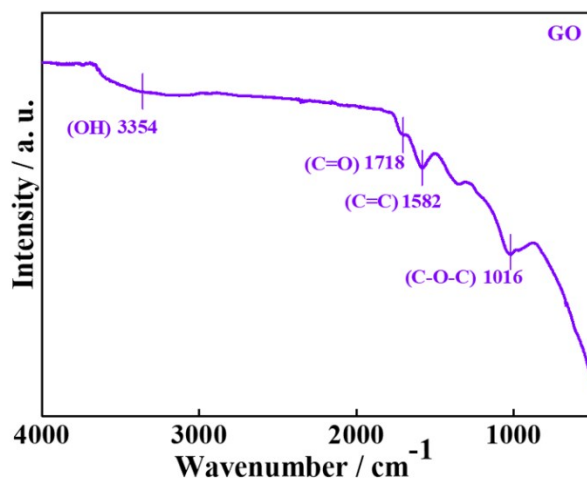
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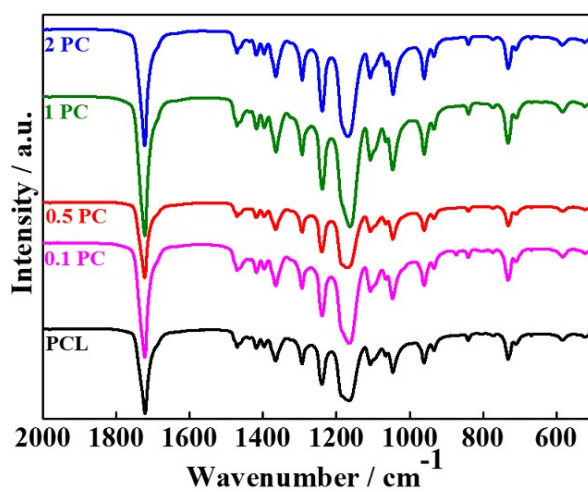
Supplementary Fig. 1. The photographs of the pure rice husk and CNCs suspension.



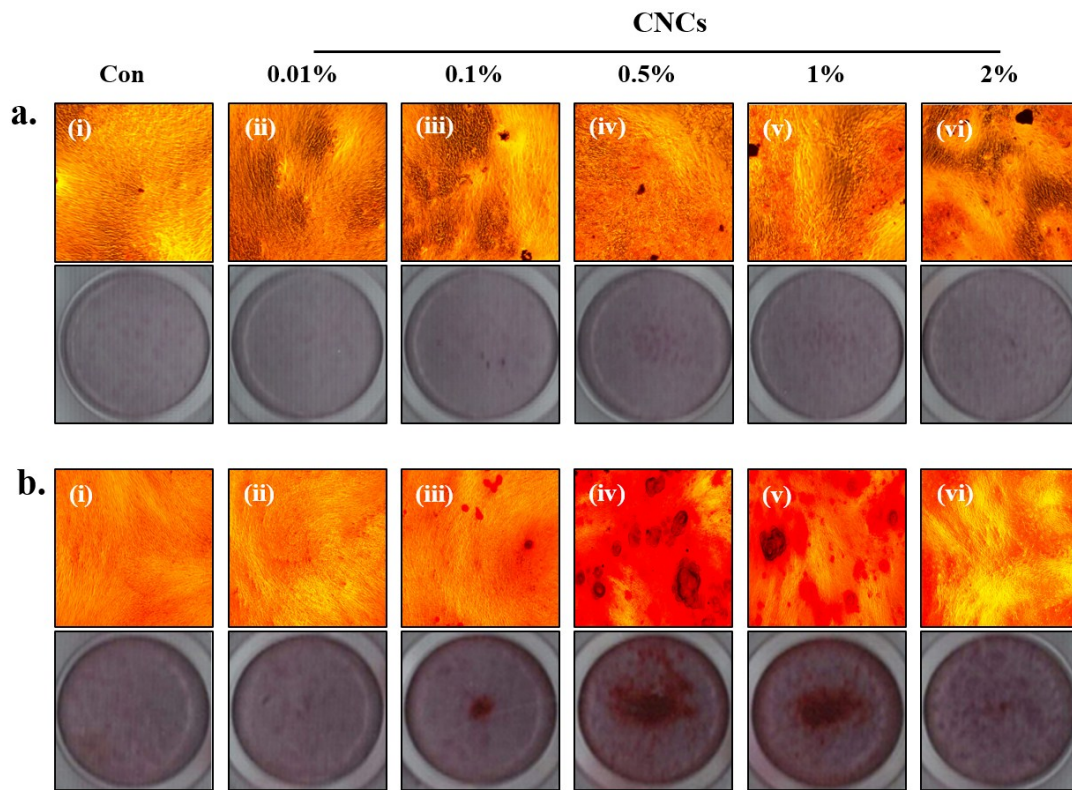
Supplementary Fig. 2. (a) AFM image of rice husk-derived CNCs ($20 \times 20 \mu\text{m}^2$), (b) DTA curve of the pure rice husk and chemically treated sample, and (c) SEM morphologies (i & ii) of the pure rice husk and the chemically treated sample, respectively.



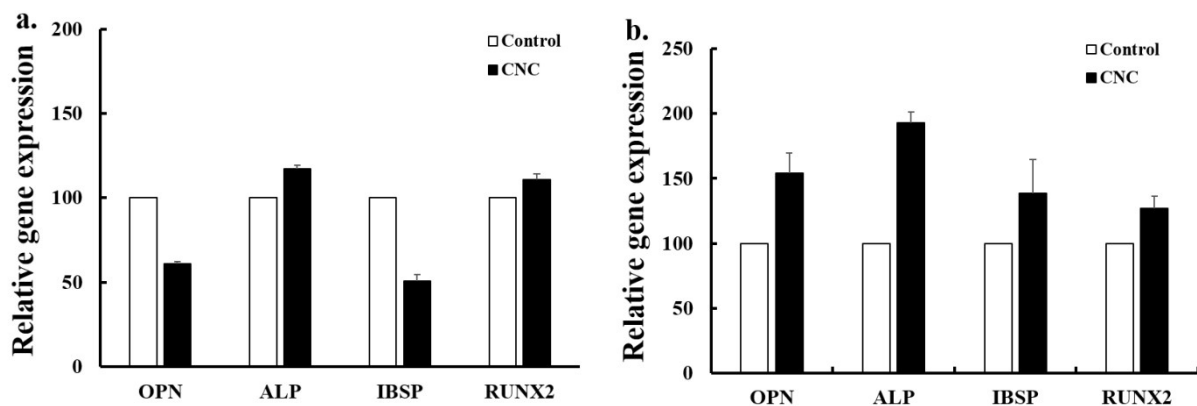
Supplementary Fig. 3. The FTIR spectrum of the prepared graphene oxide with indicated chemical moieties.



Supplementary Fig. 4. The FTIR spectra of pure PCL and its indicated electrospun composite scaffolds.



Supplementary Fig. 5. Mineralized nodule formation stained by Alizarin Red S. hMSCs treated with CNCs for **(a)** 7 and **(b)** 14 days: **(i)** control, **(ii)** 0.01% CNCs, **(iii)** 0.1% CNCs, **(iv)** 0.5% CNCs, **(v)** 1% CNCs, and **(vi)** 2% CNCs.



Supplementary Fig. 6. PCR analysis for the expression of osteogenic differentiation-specific genes under the induced conditions **(a)** 7 and **(b)** 14 days.

Table:

Step	Speed (rpm)	Time (s)	Ramp (s)
1	2000	30	10
2	3000	30	10
3	4000	30	10
4	5000	30	10
5	6000	30	10
6	4000	30	10
7	0	30	10

Supplementary Table 1. Conditions for graphene oxides coating on a glass substrate.

Name		Sequence (5'-3')	Accession No.	Product size (bp)
ALP	(F)	GGACATGCAGTACGAGCTGA	BC090861	357
	(R)	GCAGTGAAGGGCTTCTTGTC		
OPN	(F)	CCCACAGACCCTTCCAAGTA	J04765	279
	(R)	ACACTATCACCTCGGCCATC		
IBSP	(F)	CAACAGCACAGAGGCAGAAA	NM_004967	248
	(R)	CGTACTCCCCCTCGTATTCA		
RUNX2	(F)	CGCATTCTCATCCCAGTAT	NM_001015051	432
	(R)	GACTGGCGGGGTGTAAGTAA		

Supplementary Table 2.Primer sequences used in the reverse transcription polymerase chain reaction.