nanomaterials

MDPI

Supplementary Materials

Effects of Zn-Doped Mesoporous Bioactive Glass Nanoparticles in Etch-and-Rinse Adhesive on the Microtensile Bond Strength

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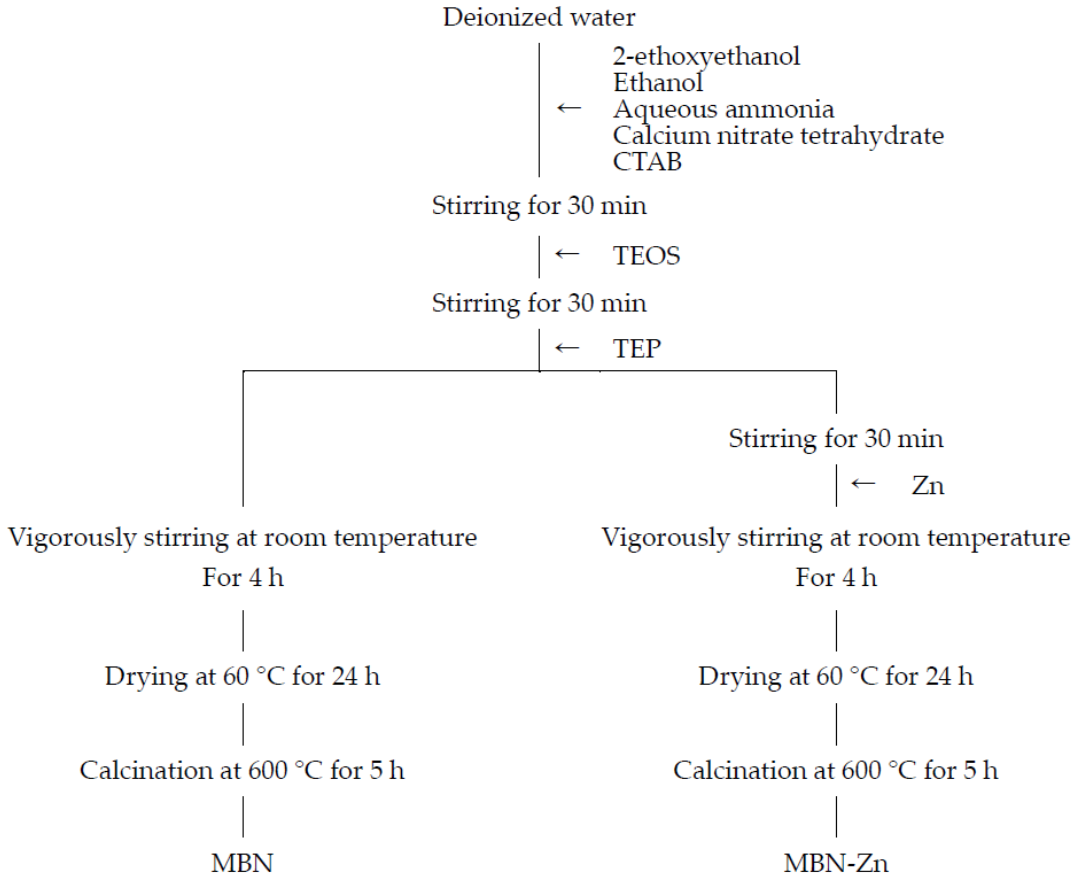

Figure S1. Flowchart of MBN and Zn-doped MBN (MBN-Zn) synthesis.

CTAB, cetyl trimethyl ammonium bromide; TEOS, tetraethyl orthosilicate; TEP, triethyl phosphate; MBN, mesoporous bioactive glass nanoparticle; MBN-Zn, Zn-doped MBN.

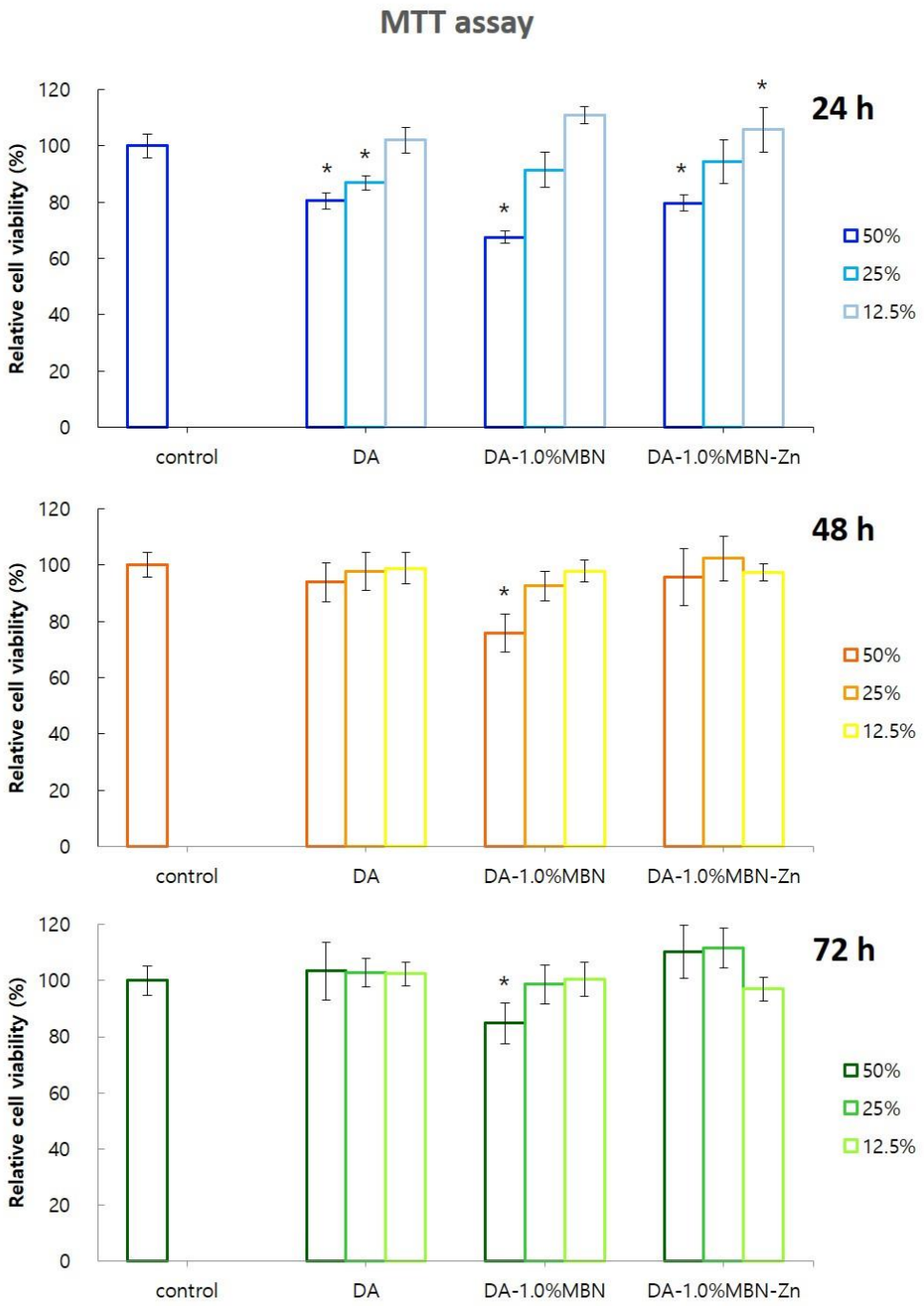

Figure S2. Cell viability analysis; hDPSCs were incubated on DA, DA-1.0%MBN, and DA-1.0%MBN at 100, 50 and 25% extract, respectively, for 24, 48, and 72 h. The cell viability with 50% extract was statistically similar to that of the control group. *ANOVA was performed and indicate that the *p*-value is not significantly different ($p < 0.05$). The error bars indicate the ± standard deviation.

Table S1. Matrix of metalloproteinase (MMP) inhibition; tested samples.

Groups		Composition	MMPs Substrate
DW		DW 400 μL	250 μL
DW+MMP inhibitor		DW 400 μL	250 μL + MMP inhibitor 100 μL
Ac 50%		DW 200 μL + Ac 200 μL	250 μL
Dental adhesive + Ac (1:1 vol%)	Ac + DA	Ac 200 μl + DA 200 μL	250 μL
	Ac + DA-0.1%MBN	Ac 200 μL + DA-0.1%MBN 200 μL	250 μL
	Ac + DA-0.5%MBN	Ac 200 μL + DA-0.5%MBN 200 μL	250 μL
	Ac + DA-1.0%MBN	Ac 200 μL + DA-1.0%MBN 200 μL	250 μL
	Ac + DA-0.1%MBN-Zn	Ac 200 μL + DA-0.1% MBN-Zn 200 μL	250 μL
	Ac + DA-0.5% MBN-Zn	Ac 200 μL + DA-0.5% MBN-Zn 200 μL	250 μL
	Ac + DA-1.0% MBN-Zn	Ac 200 μl + DA-1.0% MBN-Zn 200 μL	250 μL

Abbreviations: MMPs, matrix metalloproteinases; DW, deionized water; Ac, acetone; MBN, mesoporous bioactive glass nanoparticle; MBN-Zn, Zn-doped mesoporous bioactive glass nanoparticle; DA-0.1%MBN, 0.1% MBN mixed dental adhesives; DA-0.5%MBN, 0.5% MBN mixed dental adhesives; DA-1.0%MBN, 1.0% MBN mixed dental adhesives; DA-0.1%MBN-Zn, 0.1% MBN-Zn mixed dental adhesives; DA-0.5% MBN-Zn, 0.5% MBN-Zn mixed dental adhesives; DA-1.0% MBN-Zn, 1.0% MBN-Zn mixed dental adhesives.

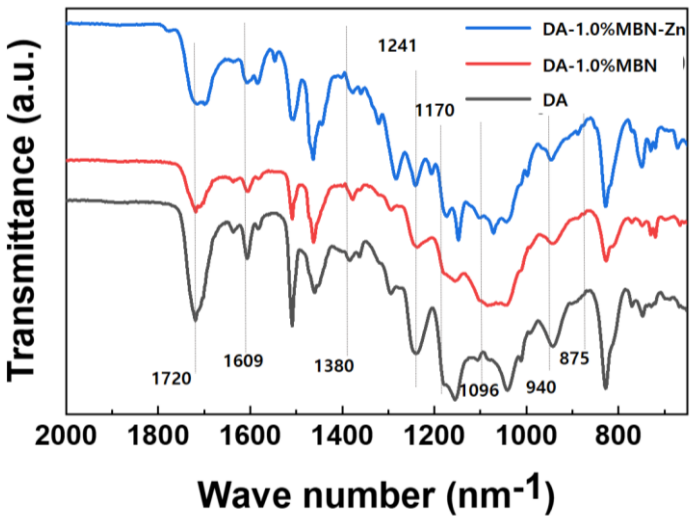

Figure s3. FT-IR spectrum for DA, DA-1.0%MBN and DA-1.0%MBN-Zn.

Table S2. Assignments of FT-IR peaks for DA, DA-1.0%MBN, DA-1.0%MBN-Zn.

Wavenumber (cm^{-1})	**Functional Group Assignment**
875	related to the presence of CO^{3-}
940	C=C stretching bend
1044	Si-O-Si stretching mode of vibration
1020-1110	Si-O-Si assymetric stretching vibration
1380	CH3 derfomation
1460	related to the presence of CO^{3-}
1545	C-N amide stretching
1609	CH2=CH stretching vibration
1720	C=O stretching
1170, 1241	Coupling between OH and CO of OH bending and CO stretching of neighboring carboxylic groups