Supplementary data

Sol-gel derived mesoporous 45S5 bioactive glass containing Mg and Zr ions: Synthesis, characterization, and in vitro biological investigation

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**Identification of calcination temperature**

**Procedure:**

Thermogravimetric analysis (TGA) and differential thermal analysis (DTA) of powders MBG1, and MBG2 were carried out on a Linseis L81/1750 instrument under an argon atmosphere from 25 to 1000 oC and the heating rate of 10 oC/min.

**Results and discussion:**

Concerning the sol-gel derived compounds (i.e. as-synthesized powders), TGA and DTA were carried out on samples MBG1, and MBG2 to recognize the calcination temperature for the next step (Fig. S1). The total weight loss up to about 700 oC was about 55, and 60 wt % for powders MBG1, and MBG2, respectively. Above ~ 700 oC, the weight loss reached a steady state for both powders. Most of the mass reduction can be attributed to two different phenomena: 1) the removal of physically adsorbed water and residual water in the gel and 2) the decomposition of organic precursors (i.e., CTAB) and nitrate precursors in the synthesis protocol, respectively. The exothermic peak at about 730 oC might be ascribed to the crystallization phenomena of the sodium-calcium-silicate amorphous network. These findings are in agreement with previous literature [1-3].

**Supplementary Figures:**



Supplementary Figure S1. a, and b) the results of TGA/DTA analyses of as-synthesized powders MBG1, and MBG2, respectively.

**References**

[1] Cacciotti, I., Lombardi, M., Bianco, A., Ravaglioli, A. and Montanaro, L., 2012. Sol–gel derived 45S5 bioglass: synthesis, microstructural evolution and thermal behaviour. *Journal of Materials Science: Materials in Medicine*, *23*, pp.1849-1866.

[2] Tabia, Z., El Mabrouk, K., Bricha, M. and Nouneh, K., 2019. Mesoporous bioactive glass nanoparticles doped with magnesium: drug delivery and acellular in vitro bioactivity. *RSC advances*, *9*(22), pp.12232-12246.

[3] Fiume, E., Migneco, C., Verné, E. and Baino, F., 2020. Comparison between bioactive sol-gel and melt-derived glasses/glass-ceramics based on the multicomponent SiO2–P2O5–CaO–MgO–Na2O–K2O system. *Materials*, *13*(3), p.540.