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Article

Effects of Incorporating B-Tricalcium Phosphate with Reaction Sintering into Mg-Based Composites on Degradation and Mechanical Integrity

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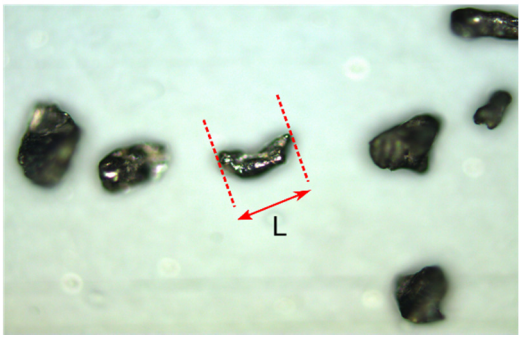

Figure S1. Optical microscopic image of Mg particles. L shows the length of the longest distance of a Mg particle contour.

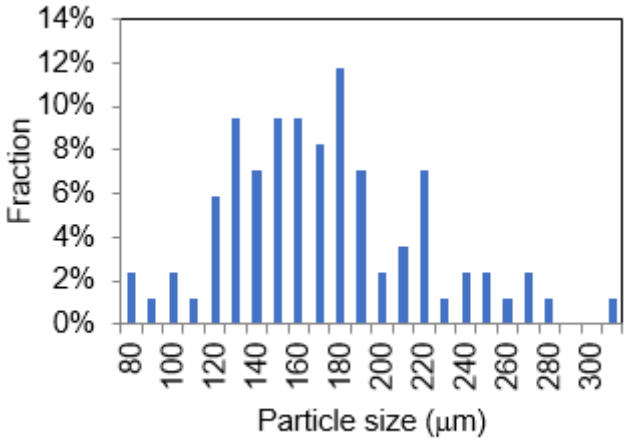

Figure S2. Histogram of Mg particle size measured from optical microscope images

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Table S1. Impurity of magnesium powder.

Element	Al	Ca	Cu	Fe	Mn	Pb	Si	Zn	Total
%	*0.03*	0.008	ND	0.009	0.01	ND	0.02	0.006	0.083

*ND: Not Detected.

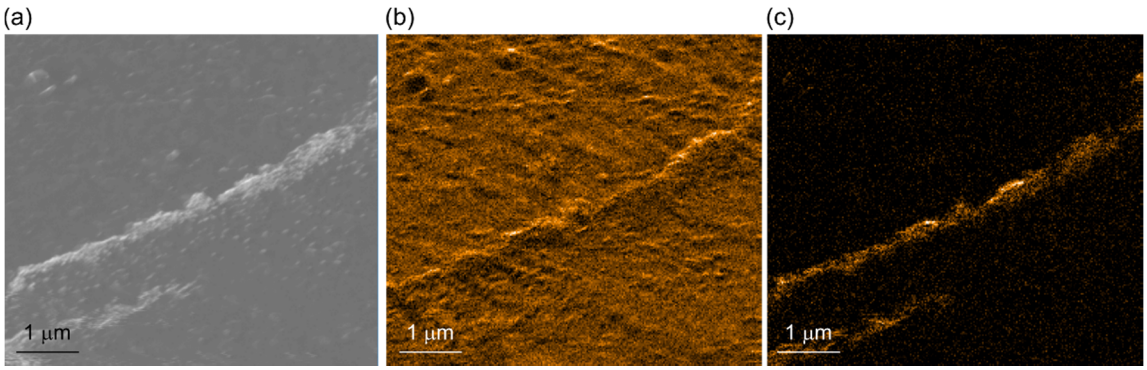

Figure S3. The boundary of sintered Mg particles obtained by Auger electron microscopy. (a) secondary electron image, (b) elemental mapping of Mg, and (c) elemental mapping of O.

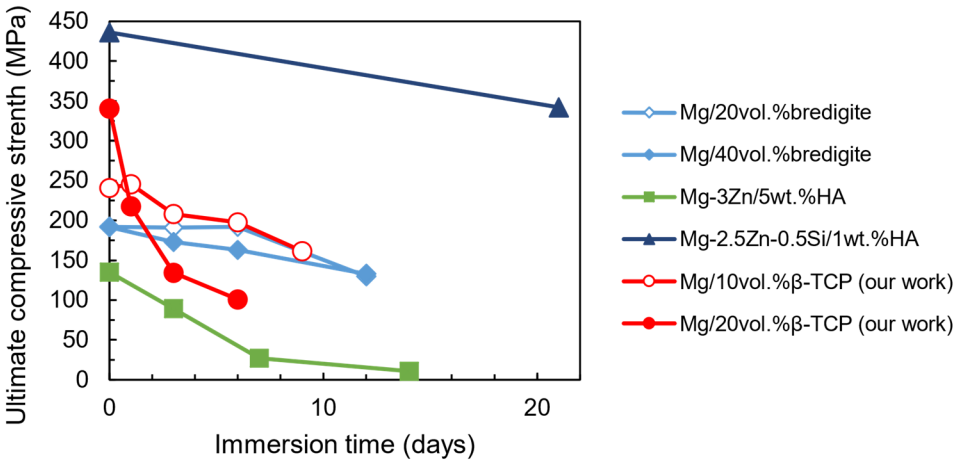

Figure S4. Ultimate compressive strength of Mg/bredigite [1], Mg-3Zn/5wt.%HA [2], Mg-2.5Zn-0.5Si/1wt.%HA [3], and Mg/β-TCP (our work).

Reference

1 Naddaf, S.; Lee, S.; Huan, Z.; Chang, J.; Zhou, J. Fabrication of novel magnesium-matrix composites and their mechanical properties prior to and during in vitro degradation. *J. Mech. Behav. Biomed. Mater.* **2017**, *67*, 74–86, doi:doi.org/10.1016/j.jmbbm.2016.10.010.

2 Parande, G.; Manakari, V.; Prasadh, S.; Chauhan, D.; Rahate, S.; Wong, R.; Gupta, M. Strength retention, corrosion control and biocompatibility of Mg–Zn–Si/HA nanocomposites. *J. Mech. Behav. Biomed. Mater.* **2020**, *103*, 103584, doi:10.1016/j.jmbbm.2019.103584.

3 Dubey, A.; Jaiswal, S.; Lahiri, D. Mechanical Integrity of Biodegradable Mg–HA Composite During In Vitro Exposure. *J. Mater. Eng. Perform.* **2019**, *28*, 800–809, doi:10.1007/s11665-018-3778-8.