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The production of $CaCO_3$ boron standard reference materials for laser ablation MC–ICP–MS studies of biogenic carbonates.

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Boron isotope systematics in marine carbonates are a useful tracer of the pH modulation at the site of calcification in many biomineralising organisms and enable the reconstruction of past changes in seawater pH. Recent advances have enabled in situ analysis of Boron isotopes by laser ablation multi–collector inductively coupled plasma mass spectrometry (LA–MC–ICP–MS). This approach offers unique insights into micron-scale variations in the $\delta^{11}B$ across biologically precipitated carbonate material, thus improving our understanding of biomineralisation mechanisms in marine organisms [1]. Well-constrained homogeneous standard reference materials are however required for laser ablation studies to ensure data accuracy, method and instrument validity, and comparability of interlaboratory results [2]. Since the commonly used JCp-1 (*Porites* coral) and JCt-1 (*Tridacna* clam fossil) reference materials are no longer commercially available, there are limited $CaCO_3$ secondary reference materials for laser ablation studies of biogenic carbonate material. Therefore, here a suite of well-characterised $CaCO_3$ boron standard reference materials were synthetically produced at the University of Southampton to improve accessibility to laser ablation reference materials and to minimise interlaboratory variations in absolute $\delta^{11}B$.

[1] Chalk, T., Standish, C., D'Angelo, C., Castillo, K., Milton, J. and Foster, G., 2021. Mapping coral calcification strategies from in situ boron isotope and trace element measurements of the tropical coral Siderastrea siderea. *Scientific reports*, 11(1), pp.1-13.

[2] Foster, G., Hönisch, B., Paris, G., Dwyer, G., Rae, J., Elliott, T., Gaillardet, J., Hemming, N., Louvat, P. and Vengosh, A., 2013. Interlaboratory comparison of boron isotope analyses of boric acid, seawater and marine CaCO3 by MC-ICPMS and NTIMS. *Chemical Geology*, 358, pp.1-14.