The production of CaCO₃ 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 δ¹¹B 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 CaCO₃ secondary reference materials for laser ablation studies of biogenic carbonate material. Therefore, here a suite of well-characterised CaCO₃ 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 δ¹¹B.
