Supporting information

Artificial Mineral Films Similar to Biogenic Calcareous Shells: Oriented Calcite Nanorods on a Self-Standing Polymer Sheet

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Additional information and data

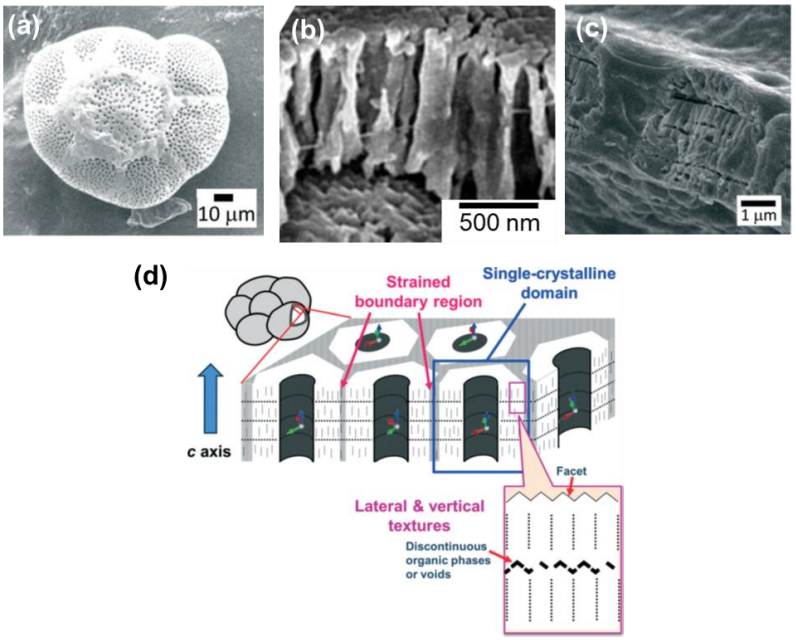

Figure S1. SEM image (a−c) and a schematic illustration (d) of cross-sectional view of a foraminiferal test. A whole image (a) and cross-sectional view (b, c).[S1]

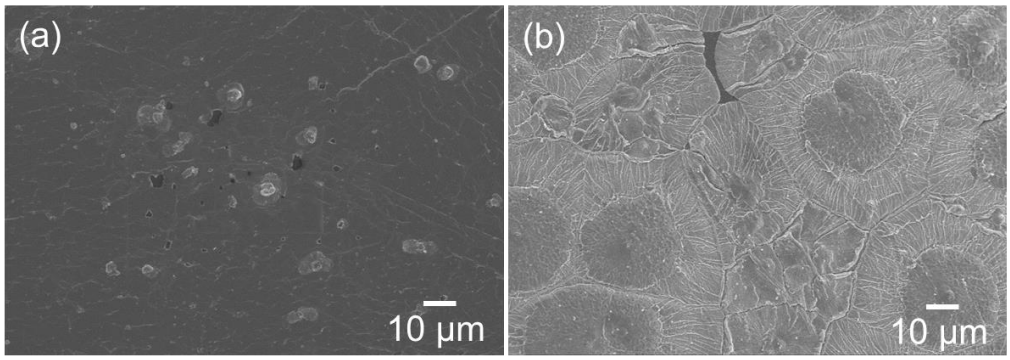

Figure S2. SEM images of films deposited for 3 h (a) and 6 h (b) on the PVA surface by introduction of CO_2 in aqueous solution at $[Ca^{2+}]$ = 10 mmol dm^{-3} and $[COOH_{PAA}]$ = 12 mmol dm^{-3}.

Influence of the solute concentration for the deposition in the first stage

Calcite nanorods elongated in the *c* direction were grown perpendicularly to the substrate from the seed layer at 1.5-2.0 of the PAA concentration ratio to calcium ion. Lower ratios resulted in formation of large faceted crystal on the seed layer (Figure S3b). Much higher PAA ratios led the inhomogeneous growth of calcite crystal on the seed (Figure S3a). Thus, we adjusted $[Ca^{2+}]$ and $[COOH_{PAA}]$ to 20 and 30 mmol dm^{-3}, respectively, for the steady growth of calcite nanorods on the seed layer.

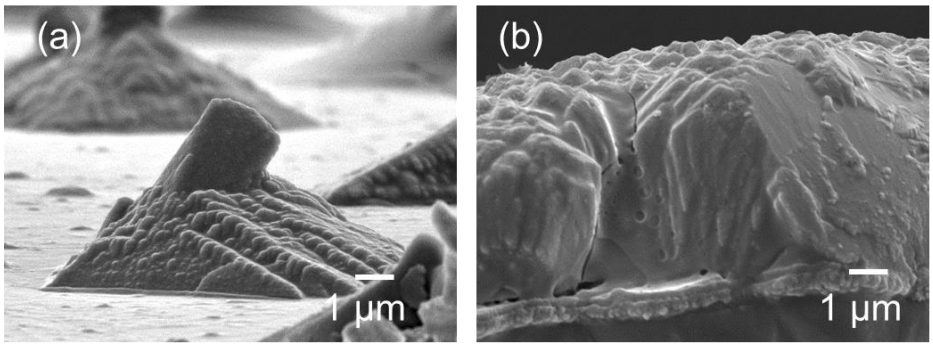

Figure S3. SEM images of the cross-sectional view of the films after over growth in aqueous solution at $[Ca^{2+}]$ = 5 mmol dm^{-3} and $[COOH_{PAA}]$ = 100 mmol dm^{-3} (a) and $[Ca^{2+}]$ = 20 mmol dm^{-3} and $[COOH_{PAA}]$ = 10 mmol dm^{-3} (b) for 24 h on the seed layer.

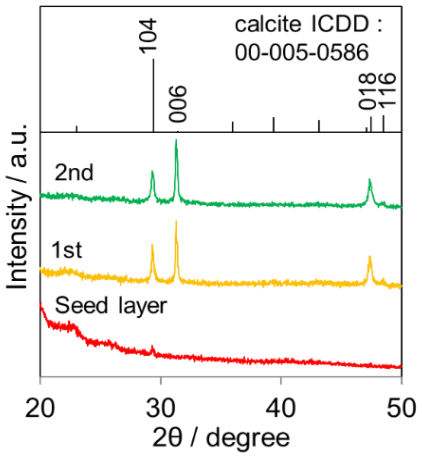

Figure S4. XRD patterns of thick films fabricated via multistep growth.

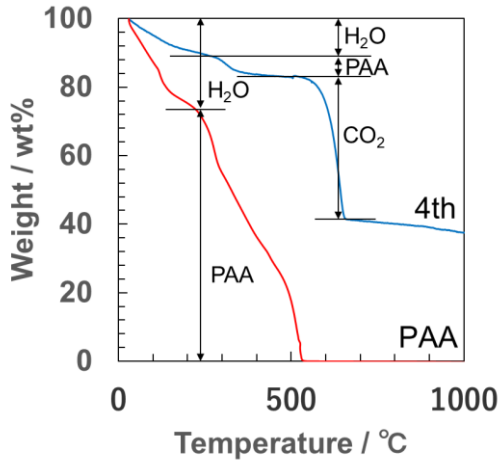

Figure S5. TG curves of thick films fabricated through multistep growth.

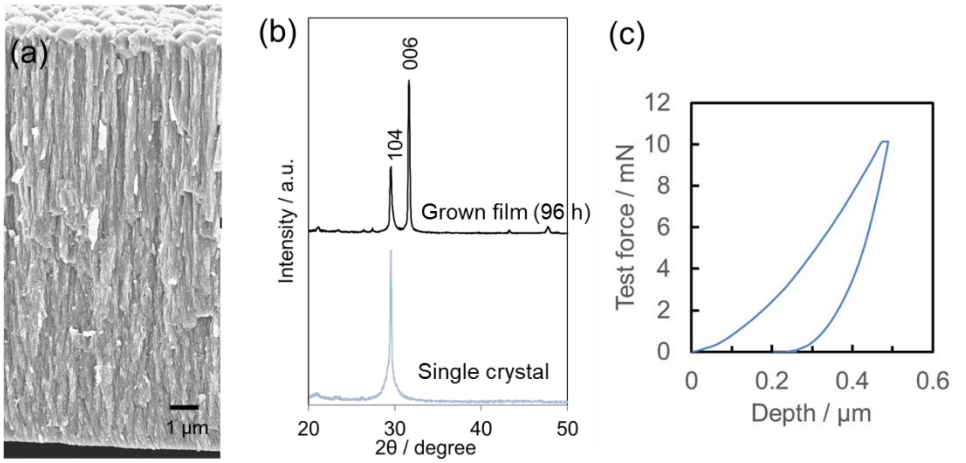

Figure S6. Cross-sectional SEM image (a) and XRD pattern (b) of a film grown on a single-crystalline substrate in aqueous solution at $[Ca^{2+}]$ = 20 mmol dm^{-3} and PAA at $[COOH_{PAA}]$ = 30 mmol dm^{-3} for 96 h. Loading and unloading curves of the film (c).

Reference

S1. K. Nakajima, Y. Nagai, M. Suzuki, Y. Oaki, K. Naito, Y. Tanaka, T. Toyofuku and H. Imai, *CrystEngComm*, 2016, **18**, 7135.