

Supporting Information

**Stress-mediated formation of nanocrystalline calcitic
microlens arrays**

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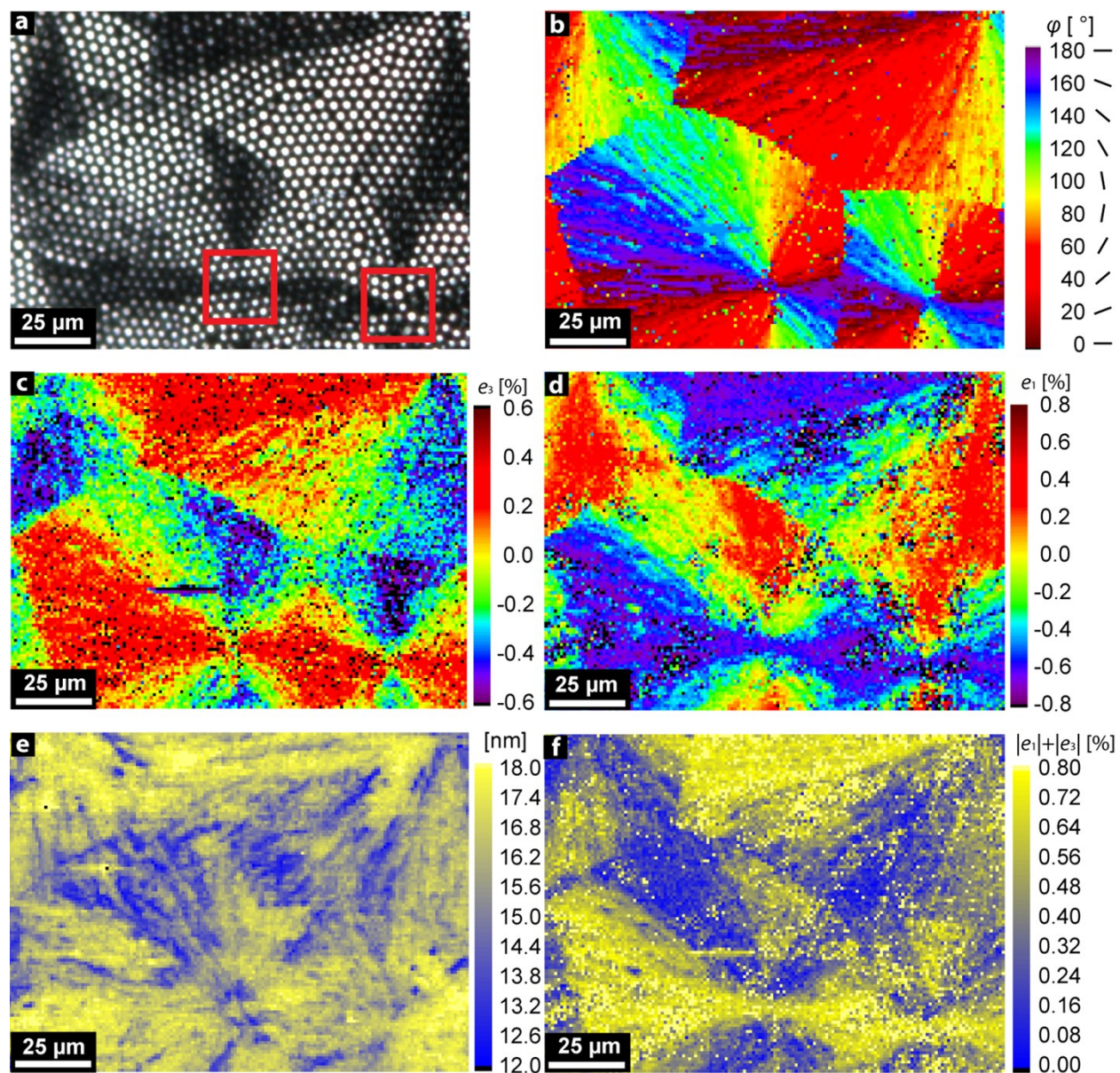


Figure S1. Summary of experimental results obtained for the second investigated sample: (a) – POM image with two Maltese crosses (centers outlined by red squares); (b) – mapping of the c-axis orientation (angle φ) with respect to the horizontal axis of the image plane; (c), (d) – mapping of relative lattice distortions (in %), e_3 and e_1 , respectively. Tensile-type distortions are colored in red, while compression-type distortions are colored in blue; (e) – mapping of crystallite size; (f) - mapping of the sum of relative distortions (in %), $|e_1| + |e_3|$.

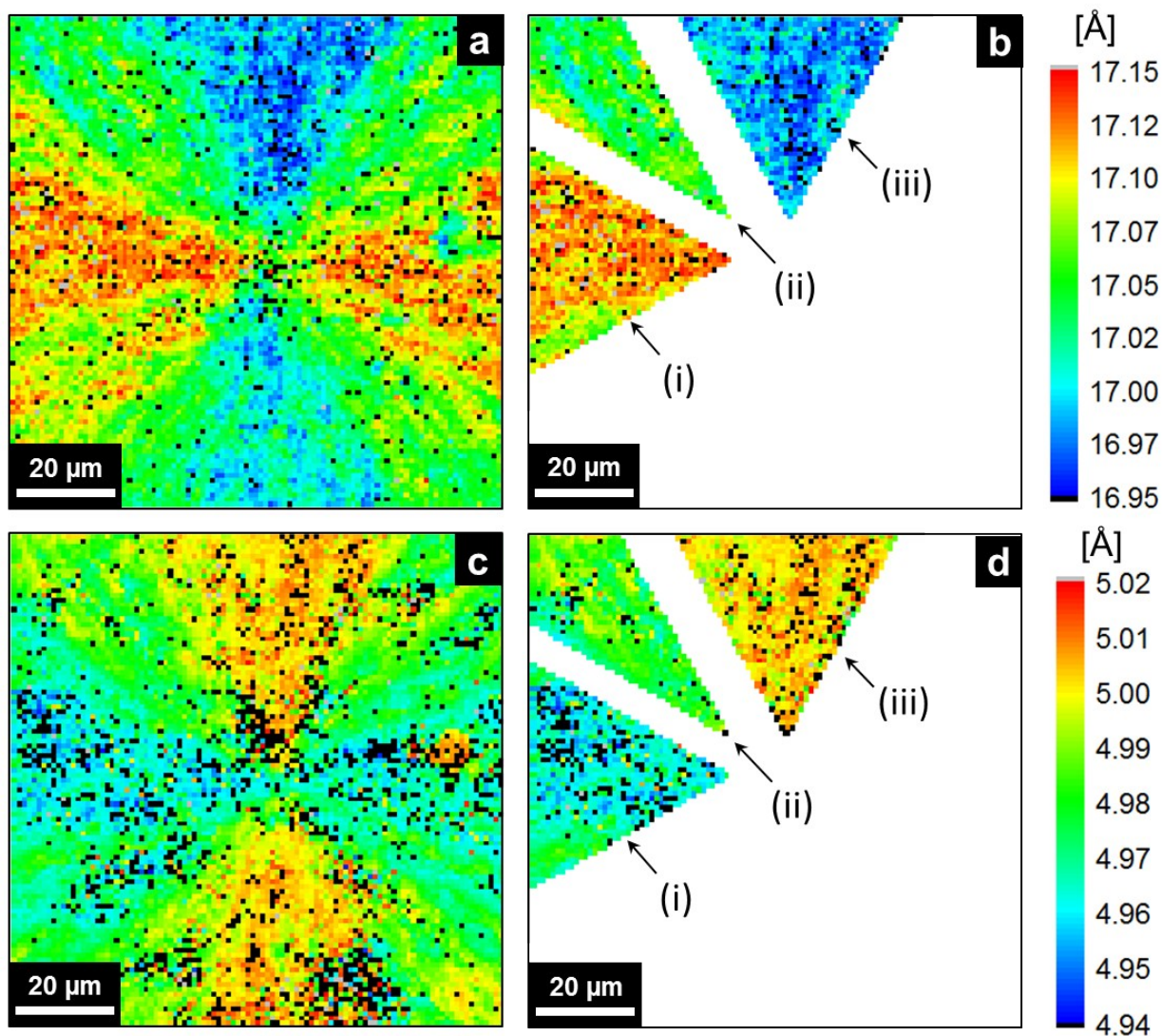


Figure S2. Mapping of the calcite lattice parameters c (maps (a) and (b)) and a (maps (c) and (d)) across MLA (first sample). Map (a) represents the distribution of the c -magnitudes across a whole measured region. Map (b) shows three regions of interest from map (a): (i) c is longer than that in geological calcite; (ii) c is comparable with that in geological calcite; (iii) c is shorter than that in geological calcite. Map (c) represents the distribution of the a -magnitudes across a whole measured region. Map (d) shows three regions of interest from map (c): (i) a is shorter than that in geological calcite, (ii) a is comparable with that in geological calcite and (iii) a is longer than that in geological calcite.

One Way Analysis of Variance on Ranks for lattice parameter *c*

Group	N	Missing	Median [Å]	25%	75%
<i>c</i> (i)	1008	51	17.113	17.099	17.125
<i>c</i> (ii)	789	15	17.050	17.032	17.067
<i>c</i> (iii)	1008	30	16.985	16.972	16.998

The differences in the median values among the treatment groups are greater than would be expected by chance; there is a statistically significant difference ($P = < 0.001$)

All Pairwise Multiple Comparison Procedures (Dunn's Method):

Comparison	Diff of Ranks	Q	P < 0.05
<i>c</i> (i) vs <i>c</i> (iii)	1645.447	46.267	Yes
<i>c</i> (i) vs <i>c</i> (ii)	808.849	21.392	Yes
<i>c</i> (ii) vs <i>c</i> (iii)	836.598	22.233	Yes

One Way Analysis of Variance on Ranks for lattice parameter *a*

Group	N	Missing	Median [Å]	25%	75%
<i>a</i> (i)	1008	108	4.963	4.959	4.970
<i>a</i> (ii)	788	35	4.982	4.975	4.988
<i>a</i> (iii)	1006	103	5.002	4.998	5.006

The differences in the median values among the treatment groups are greater than would be expected by chance; there is a statistically significant difference ($P = < 0.001$)

All Pairwise Multiple Comparison Procedures (Dunn's Method):

Comparison	Diff of Ranks	Q	P < 0.05
<i>a</i> (iii) vs <i>a</i> (i)	1486.530	42.765	Yes
<i>a</i> (iii) vs <i>a</i> (ii)	830.822	22.812	Yes
<i>a</i> (ii) vs <i>a</i> (i)	655.709	17.990	Yes

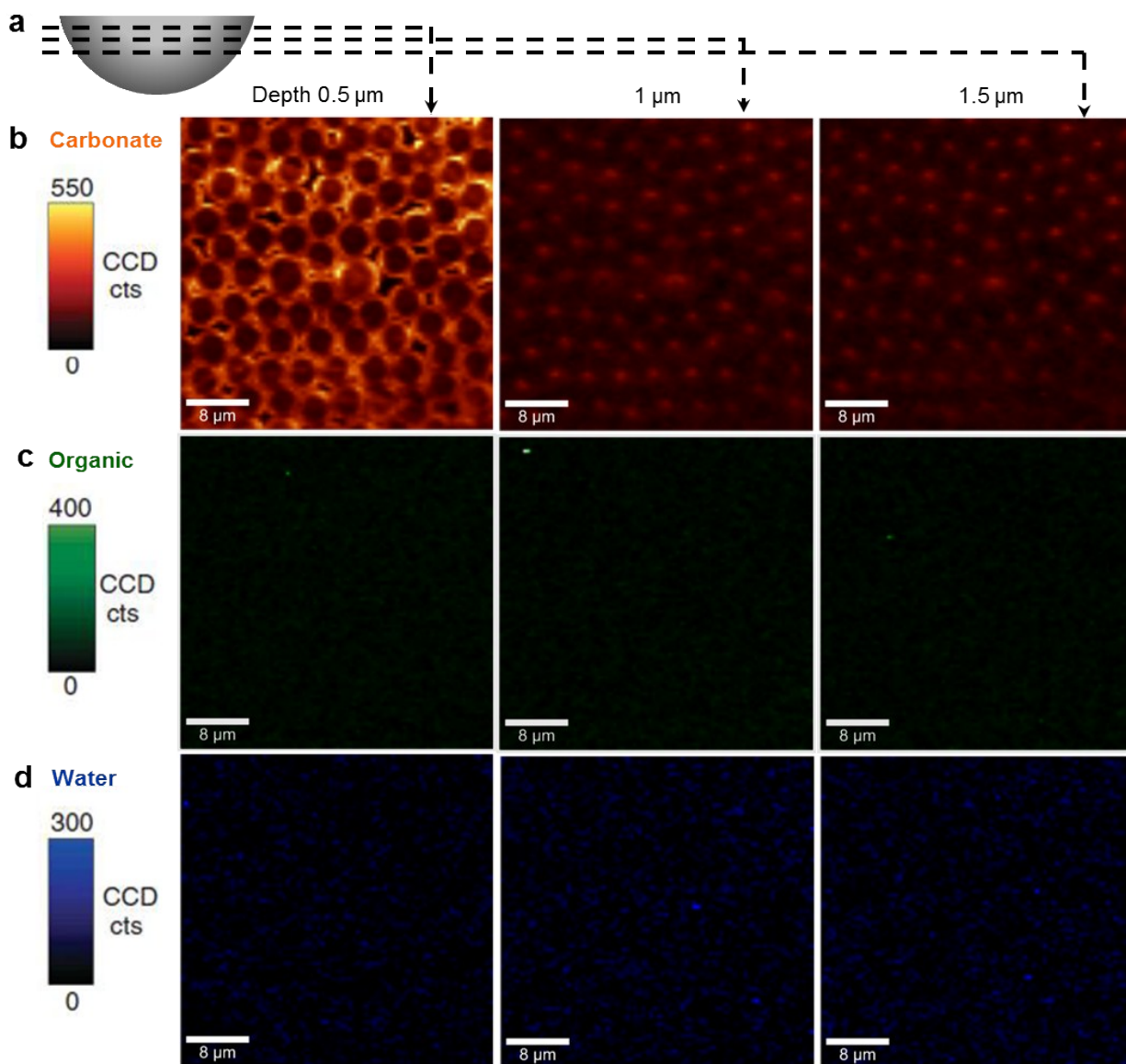


Figure S3. Confocal Raman imaging and characterization of calcitic MLA performed at different depths, $z = 0.5 \mu\text{m}$; $1 \mu\text{m}$; $1.5 \mu\text{m}$, as indicated in (a). Images are taken in three spectral intervals, characteristic for: (b) carbonate ($1.040\text{-}1.125 \text{ cm}^{-1}$), (c) organics ($2.800\text{-}3.000 \text{ cm}^{-1}$), and (d) water ($3.000\text{-}3.500 \text{ cm}^{-1}$). No signal from polysorbate 20 was found at all probed depths after crystallization.