

Supplementary Information

Chemical solution deposition of the highly *c*-axis oriented apatite type lanthanum silicate thin films

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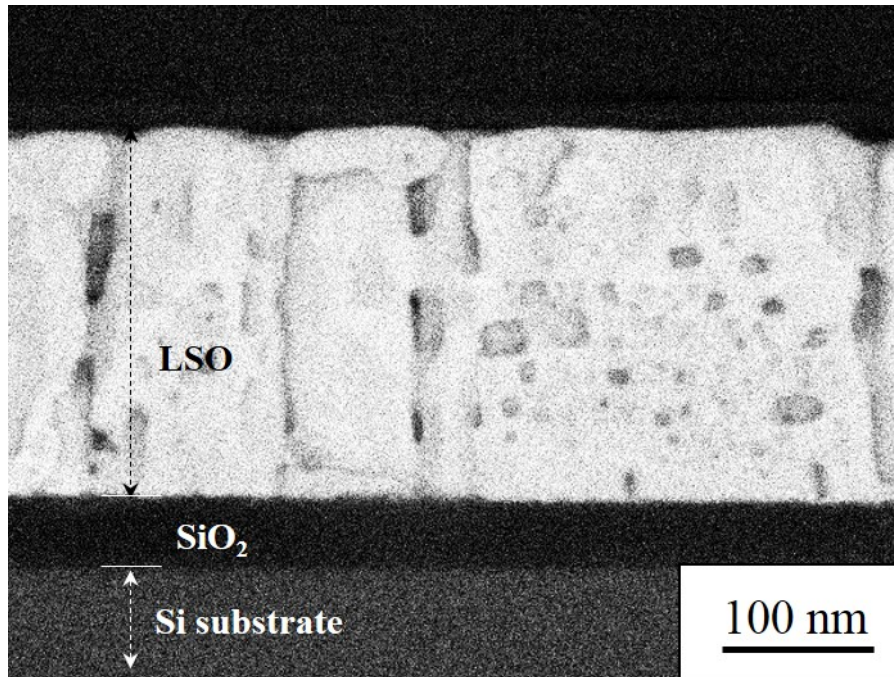


Figure S1 Cross-sectional backscattered electron images of the highly *c*-axis oriented LSO thin film.

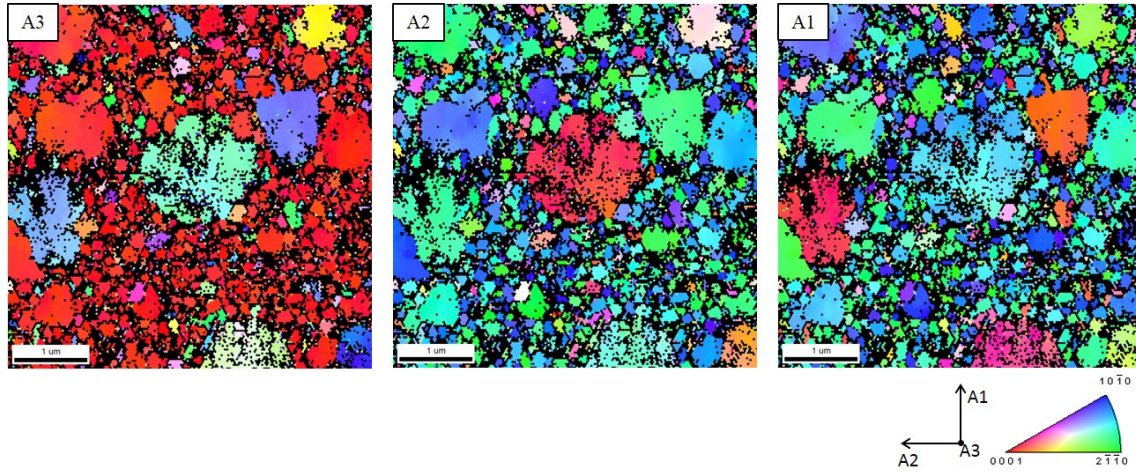


Figure S2 Inverse pole figure maps with different observation directions.

Each domain exhibited a single color for each direction, which suggests a tri-axial orientation.

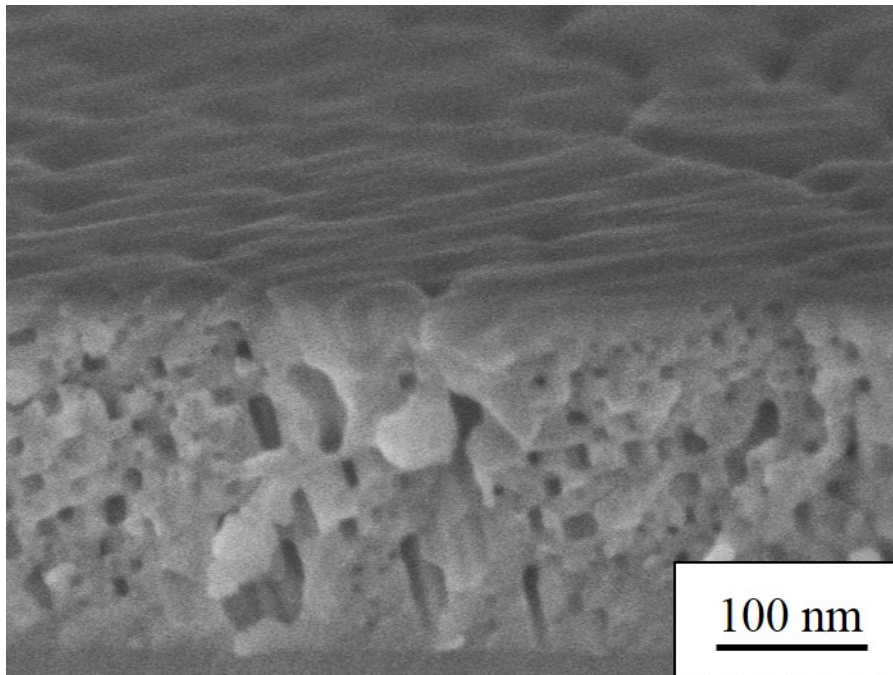


Figure S3 Diagonal cross section of the domain of the LSO thin film prepared from non-refluxed solution.

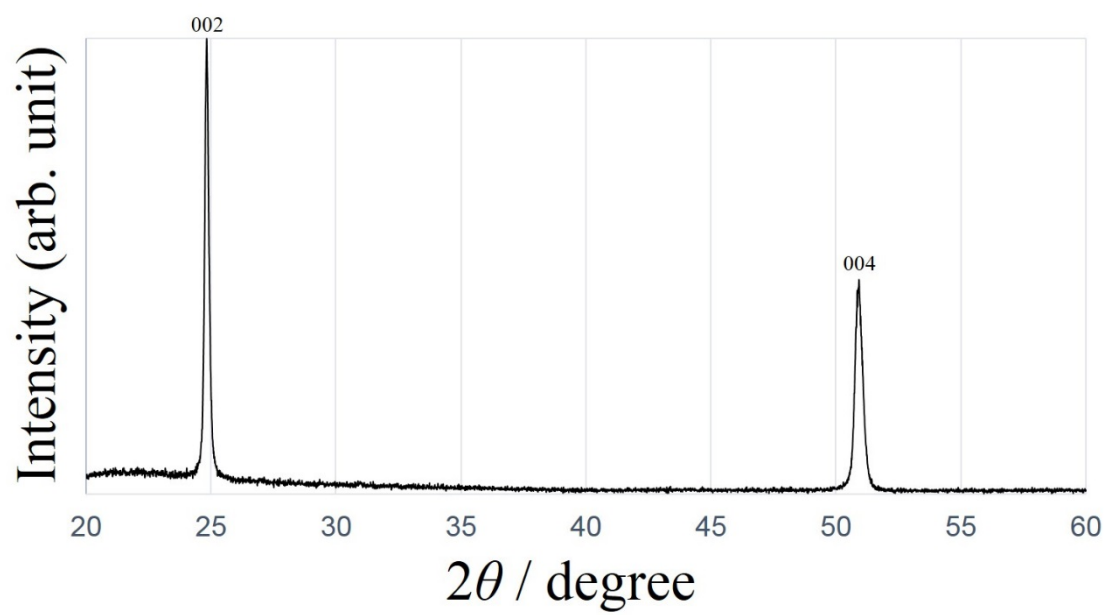


Figure S4 XRD pattern for LSO thin film on a quartz glass substrate.

The LSO thin film was obtained by the same procedure described in the experimental section using a non-refluxed solution.

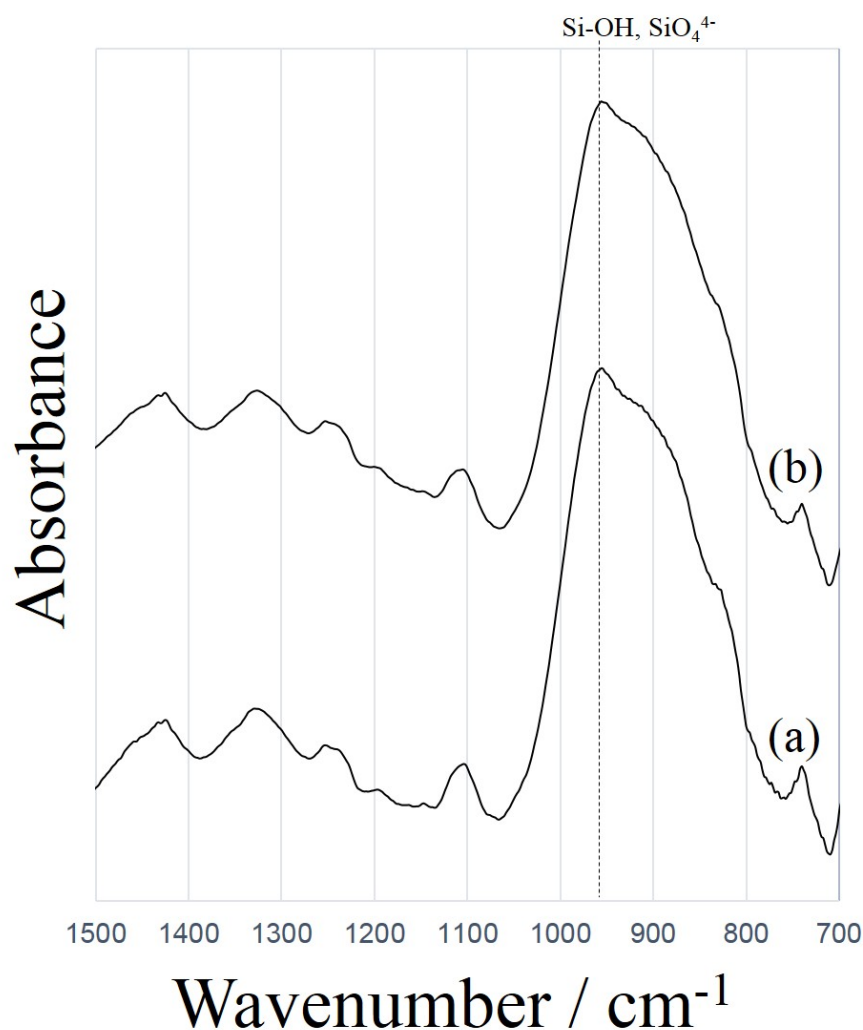


Figure S5 FT-IR spectra of the LSO thin films prepared from (a) refluxed and (b) non-refluxed solutions. Both spectra were measured by ATR-mode and normalized at the maximum peak marked by broken line.

Both spectra were identical each other. Because thermal decomposition of $\text{La}(\text{NO}_3)_3$ is known to result in LaONO_3 at 400°C ,^{S1-S3} broad two peaks from $1280 - 1500 \text{ cm}^{-1}$ can be attributed to lanthanum nitrate which shows the peaks at $1455, 1425, 1325, 1300 \text{ cm}^{-1}$.^{S3} Strong peak from $800 - 1050 \text{ cm}^{-1}$ is known to be related to Si-OH and SiO_4^{4-} .^{S3} Relative small siloxane (Si-O-Si) peak generally appears at ca. 1080 cm^{-1} interestingly suggests that Si-O bonding state in LSO precursor thin films are mainly SiO_4^{4-} . Other peaks at ca. $750, 1200, 1250 \text{ cm}^{-1}$ derived from Si substrate.

References

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S2 S. Mentus, D. Jelić and V. Grudić, *J. Therm. Anal. Calorim.*, 2007, **90**, 393.

S3 B. Ballinger, J. Motuzas, C. R. Miller, S. Smart and J. C. Diniz da Costa, *Scientific Reports*, 2015, **5**, 8210