ELECTRONIC SUPPLEMENTARY INFORMATION

Unveiling the Efficiency of Microwave-Assisted Hydrothermal Treatment for the Preparation of $SrTiO_3$ Mesocrystals

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Experimental Results

X-ray diffraction of samples SAM2, SAM3 and SAM4 obtained via MAH route are shown in Fig.S1. All the diffraction peaks were indexed to a cubic structure of $SrTiO_3$ phase in accordance with JCPDS file 35-0734.

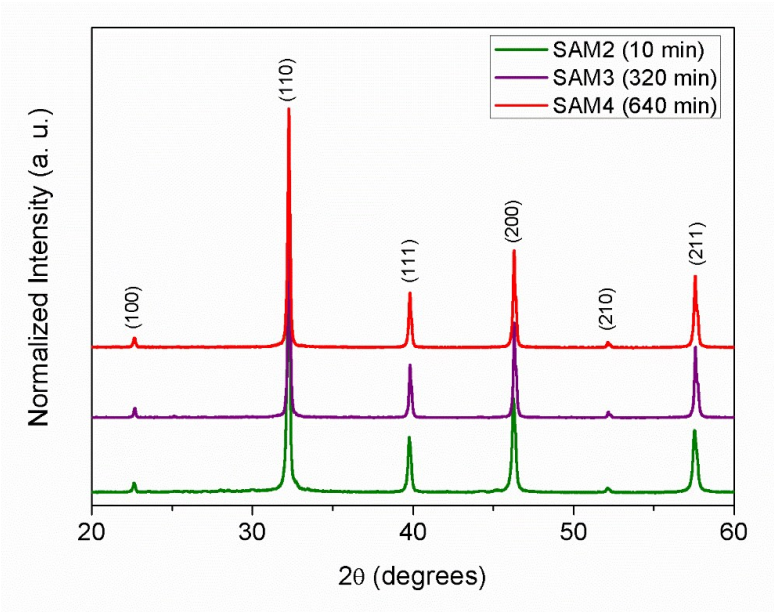

Fig. S1. XRD patterns of samples treated at 140 °C at different treatment times in the MAH system.

The structure was refined using the Rietveld method and the General Structure Analysis System (GSAS) package with the EXPGUI graphical user interface.[1] The data were collected in the 2θ = 10- 100° range with a 1° divergence slit, 0.3 mm receiving slit, 0.02° step width, and 5 s point^{-1} using a Rigaku diffractometer (model RU200B) with a CuKα radiation source. The XRD patterns

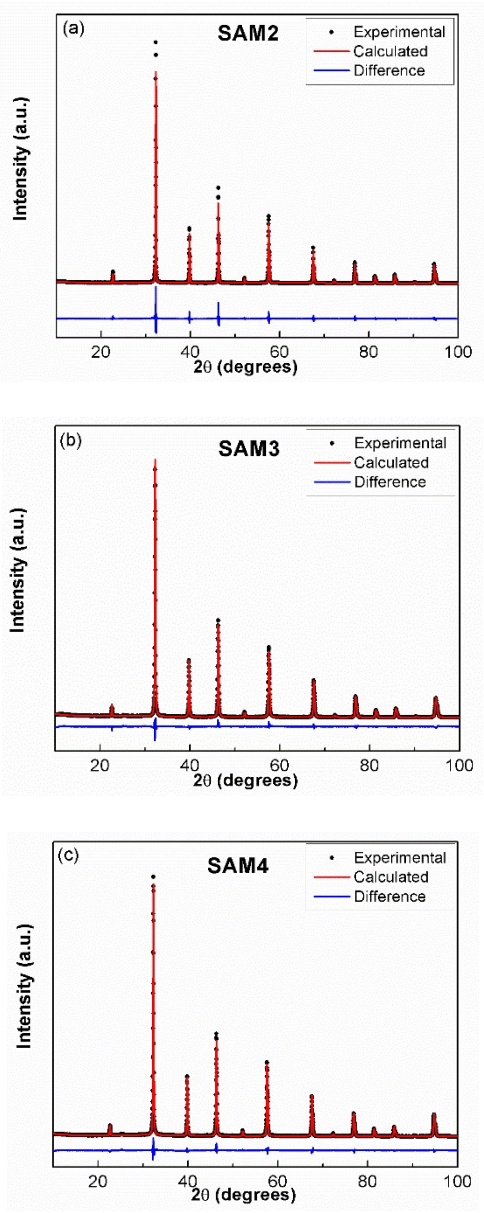

Fig. S2. Rietveld graphics for SAM2, SAM3 and, SAM4 samples. The corresponding refinement results are presented in Table 1 of the manuscript.

Figure S3 shows the FTIR spectra of SAM2, SAM3 and SAM4 samples. The spectra were recorded on a Bruker (Equinox 55) infrared spectrometer in reflectance mode from 400 to 4000 cm^{-1} at a resolution of 4 cm^{-1} and a signal average of 32 scans. The samples were mixed with KBr using a 1:10 ratio. It can be observed that the low-frequency band centered at 590 cm^{-1} is typical of metal-oxygen stretching in titanate compounds.[2,3] In addition, the bands at 1770, 1464, and 1110 cm^{-1} are associated with carbon groups adsorbed onto samples surface.[3,4] The 3420 and 1650 cm^{-1} centered bands can be attributed to the stretching vibration of the O-H bond from the water adsorbed on the particle surface during hydrothermal treatment.[5,6] According to the literature, the presence of OH groups on the nanoparticle surface is the driving force for the process of coalescence or aggregation of the particles giving rise to the formation of the cubes.[5–7] Thus, the existence of these bonds is in good agreement with the proposed model on the morphological evolution of the STO phase cubes.

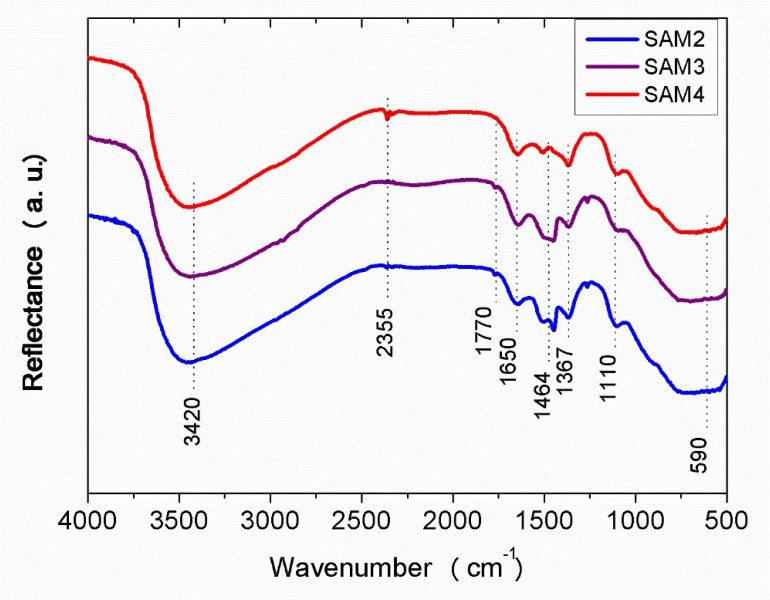

Fig. S3. FTIR spectra of the SAM2, SAM3 and SAM4 samples.

References

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