

## [Support Information]

### **Evolution of the structural and microstructural characteristics of SrSn<sub>1-x</sub>Ti<sub>x</sub>O<sub>3</sub> thin films under the influence of the composition, the substrate and the deposition method**

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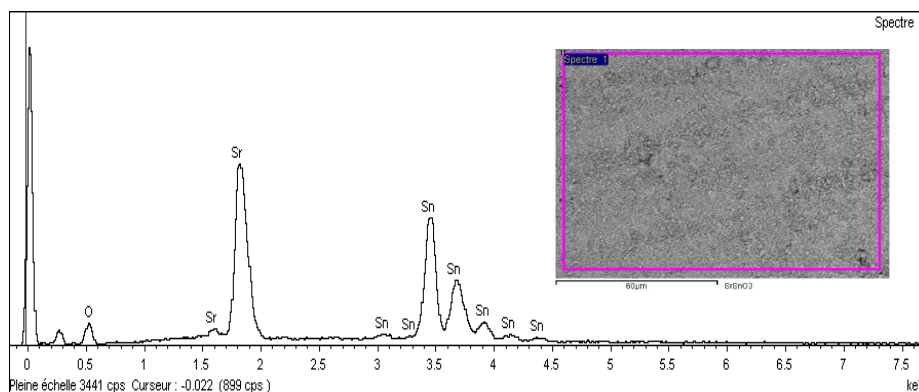
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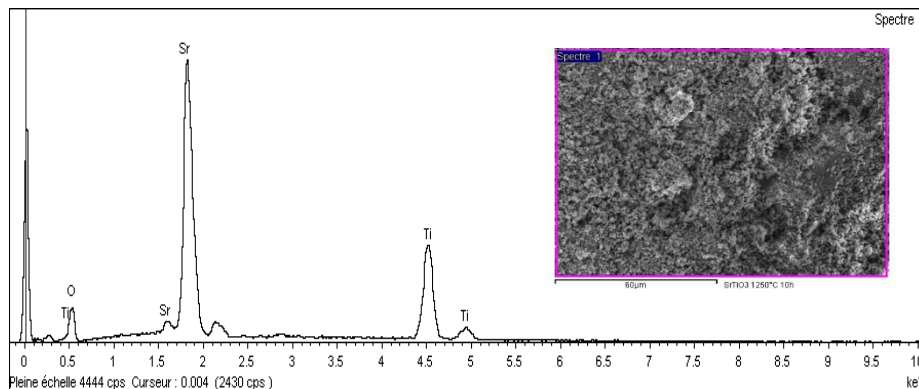
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The EDX spectra for  $\text{SrSnO}_3$  (SSO) and  $\text{SrTiO}_3$  (STO) sintered targets are shown in **Figure S1-2**, respectively. The analyses were conducted on a SEM-EDS JEOL microscope (JSM 6400, Oxford INCA), using a voltage of 20 kV. Four spectra of each composition were collected for a higher precision atomic percentage evaluation. Only the elements relative to the composition of the target were detected and the average atomic percentages of the element were calculated and are shown on Table S1.



**Figure S1.** EDX spectrum of the SSO target. The SEM image relative to the spectrum is shown as insert.



**Figure S2.** EDX spectrum of the STO target. The SEM image relative to the spectrum is shown as insert.

**Table S1.** Average atomic percentage obtained from the EDX analysis of the SSO and STO targets.

<b>Sample</b>	<b>Atomic (%)</b>				<b>Total</b>
	<b>Sr L</b>	<b>Sn L</b>	<b>Ti L</b>	<b>O K</b>	
SSO	21.2	20.3	-	58.5	100%
STO	23.8	-	21.2	55.0	100%

**Table S2** – Band emission components deconvoluted from PL spectra of SST films grown on R-sapphire by CSD method.

Sample	<u>Violet - Blue</u>		<u>Green</u>		<u>Yellow-Orange</u>		<u>Red</u>	
	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)
R-sapphire	437, 485	61	538	21	600	17	682, 699	1
STO	419, 453	41	507	31	570	28	-	-
SST50	422, 463	53	517	27	577	19	-	-
SSO	433, 465	46	509, 557	54	-	-	-	-

**Table S3** – Band emission components deconvoluted from PL spectra of SST films grown on R-sapphire by PLD method.

Sample	<u>Violet- Blue</u>		<u>Green</u>		<u>Yellow-Orange</u>		<u>Red</u>	
	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)
R-sapphire	437, 485	61	538	21	600	17	682, 699	1
STO	449	23	509	47	577	30	-	-
SST50	443	20	502, 556	67	610	12	-	-
SSO	425, 466	48	524	30	585	22	-	-

**Table S4** – Band emission components deconvoluted from PL spectra of SST films grown on LAO by CSD method.

Sample	<u>Violet -Blue</u>		<u>Green</u>		<u>Yellow-Orange</u>		<u>Red</u>	
	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)
LAO	461	17	561	14	611	30	672, 703, 730, 736	36
STO	473	3	-	-	573, 618	47	703, 712, 730	50
SST50	468	5	-	-	574, 613	53	665, 703, 719, 730	42
SSO	462	3	-	-	575, 619	56	667, 703, 721, 730	41

**Table S5** – Band emission components deconvoluted from PL spectra of SST films grown on LAO by PLD method.

Sample	<u>Violet- Blue</u>		<u>Green</u>		<u>Yellow- Orange</u>		<u>Red</u>	
	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)	$\lambda_m$ (nm)	(%)
LAO	461	17	561	14	611	30	672, 703, 730, 736	36
STO	468	6	569	10	610	40	662, 703, 728, 730	43
SST50	430, 495	7	-	-	581, 636	57	687, 703, 730, 737	36
SSO	479	7	568	11	610	39	663, 703, 730, 731	43

