**Supporting information**

A facile two-step thermal process for producing dense phase pure cubic Ta-doped lithium lanthanum zirconium oxide electrolyte for upscaling

Diwakar Karuppiah 1,2,\*, Dmitrii Komissarenko 1,3, Nur Sena Yüzbasi 1, Yang Liu 1, Pradeep Vallachira Warriam Sasikumar 1,4, Amir Hadian 1,3, Thomas Graule, Frank Clemens 1, Gurdial Blugan 1,\*

1 Laboratory for High-Performance Ceramics, Empa, Swiss Federal Laboratories for Materials Science and Technology, CH-8600, Dübendorf, Switzerland

2 Department of Mechanical Engineering Applied Mechanics, University of Pennsylvania, Philadelphia, PA 19104, USA

3 University of Applied Sciences and Arts Northwestern Switzerland (FHNW), CH-5210 Windisch,   
Switzerland

4 ADVANO, Lakeshore Drive, New Orleans, LA 70112, USA

**\*** Correspondence: [diwakarkaruppiah92@gmail.com](mailto:diwakarkaruppiah92@gmail.com) and [gurdial.blugan@empa.ch](mailto:gurdial.blugan@empa.ch)



**Fig. S1** Schematic representation of the experimental process of Ta:LLZO.



**Fig. S2(a-d)** TG and DTA of wet milled La2O3, Ta2O5, ZrO2 and Li2CO3 ­powder.