Effects of Lithium Carbonate on Lithium Lanthanum Zirconium Oxide Ionic Conductivity

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Introduction

Ionic conductivity is an important factor to observe within SSEs as it contributes to its efficiency. However, the formation of lithium carbonate reduces the battery's efficiency.

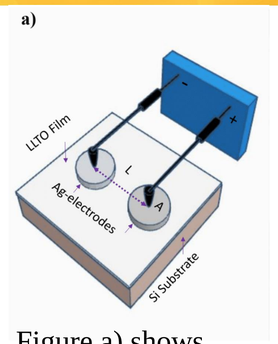
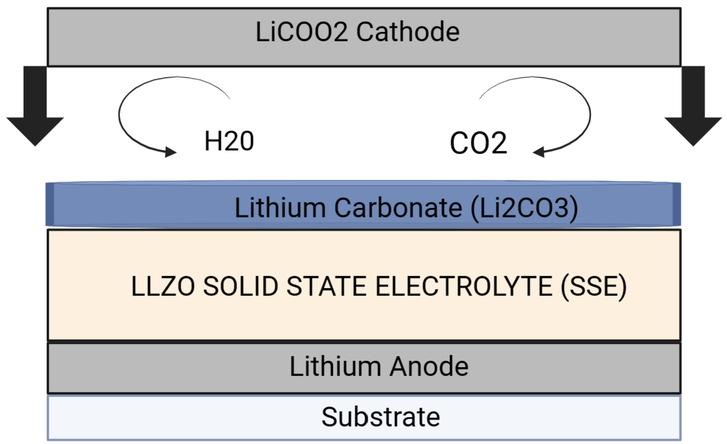


Figure a) shows EIS Measurement of a 2 electrode in-plane configuration

Atmospheric Plasma is the process where compressed gas is ionized as it passes through a high voltage region.

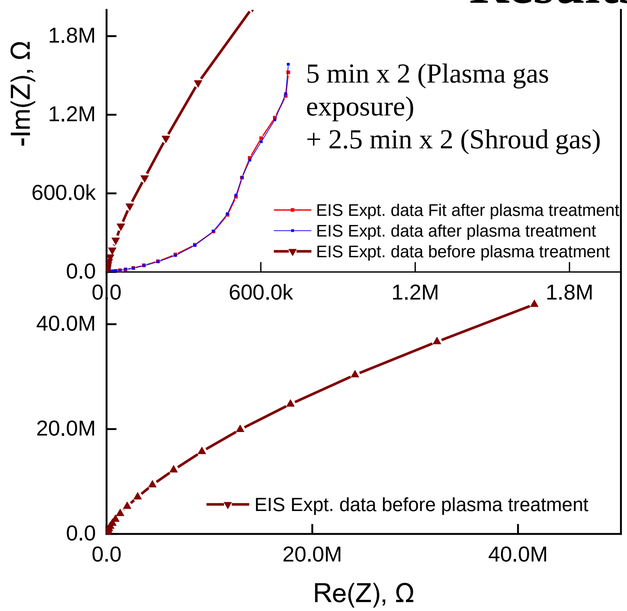
- Tunable plasma temperature (<100 °C > 1200 ° C)
- Gas (N_2) flow rate
- Tunable plasma chemistry
- Shroud gas chemistry and flow rate
- Distance between the substrate and plasma jet

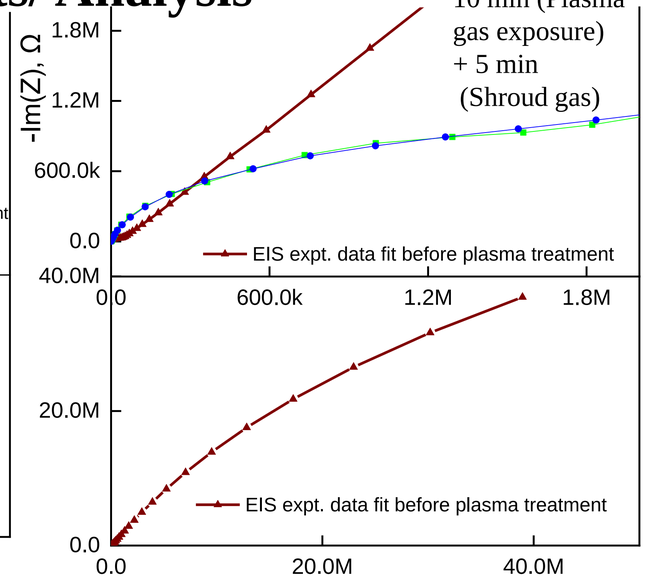


Objective

Changing the LLZO samples' parameters through plasma spray coating will help reduce the presence of lithium carbonate in LLZO.

Results/ Analysis





After plasma treatment significant reduction in:

- Overall LLZO resistance is observed
- Require electrodes that can characterize EIS to a better accuracy

Conclusion

The high ionic conductivity of the LLZO SSE with micron-scale thicknesses and improved mechanical properties are a key step for showcasing the breakthrough solid-state battery technology.

Future Work

To find the best type of electrode for LLZO samples during EIS testing.

Acknowledgements

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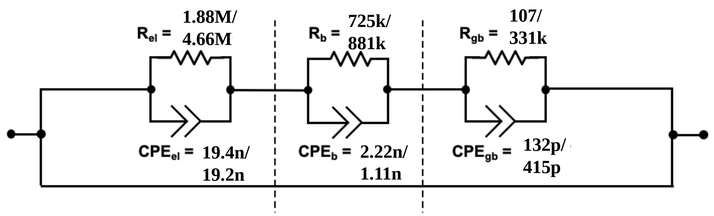

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