



Thursday, 30th August 2018
12.00h CIC energiGUNE
Seminar room

Host:
Dr. Montse Galceran

Seminar: “Sintering additives used to prepare garnet-type solid electrolyte at low temperatures”

Speaker:

Dr. Nataly Carolina Rosero-Navarro

From:

Faculty of Engineering, Hokkaido University, Sapporo, Japan

All-solid-state lithium batteries are a very attractive proposal to outperform the limitations of the conventional lithium ion batteries based in liquid electrolytes due to safety issues. The garnet-type solid electrolytes have received attention because of a high Li^{+1} conductivity at low temperatures ($\sim 10^{-3}$ – 10^{-4} S/cm), high chemical stability against Li metal and wide potential windows with electrochemical decomposition voltage of ~ 6 V vs. elemental Li anode. The control of the chemical stoichiometry, especially the lithium content in the garnet structure due to its volatile nature at high temperature during the sintering, is a challenge. The optimization of higher ionic conductivities at lower sintering temperatures has been led mainly by the formulation of new chemical composition and microstructural modification of garnet material by the incorporation of sintering additives.

This presentation will be focused on the effect of different sintering additives on the sintering behavior and lithium ion conductivity of the garnet-type solid electrolytes obtained at low temperatures. Glasses with low softening temperature (< 800 °C) and lithium compounds with low melting point (< 850 °C) have been considered. Sintering additives have been effective to reduce the sintering temperature to 800 – 900 °C.

References

- [1] K. Tadanaga, R. Takano, T. Ichinose, S. Mori, A. Hayashi, M. Tatsumisago, *Electrochem. Commun.*, 33 (2013) 51.
- [2] R. Takano, K. Tadanaga, A. Hayashi, M. Tatsumisago, *Solid State Ionics*, 255 (2014) 104.
- [3] N.C. Rosero-Navarro, T. Yamashita, A. Miura, M. Higuchi and K. Tadanaga, *J. Am. Ceram. Soc.* 100 (2017) 276.