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# Temperature Dependent $\mu$SR Study in Sr Doped $LaF_3$

Due to the highest electronegativity of F ions, the highest electrical conductivity of fluorides [1] and the higher energy density (estimated theoretically [2]) than Li-ion batteries, metal fluorides attracted the attentions for all-solid-state battery materials for next generation. Since muon spin rotation and relaxation ($\mu$SR) method is used to study the dynamics of ions in battery materials [3,4], we performed $\mu$SR measurements in LaF3 with and without doped by Sr to understand the F ion dynamics in the temperature range 50 K –470 K. At low temperatures, the static behavior is dominant showing the strong F-$\mu$-F bonds. However, at higher temperatures (> 300 K), the dynamic behavior is observed. Several trial models to understand those dynamic behavior of muon and F ions will be presented in the program.
[1] K. Mori, et al., *J. Phys. Chem.* C **124** (2020) 18452–18461.
[2] F. Gschwind, et al., *J. Fluorine Chemistry* **182** (2016) 76–90.
[3] J. Sugiyama, et al., *Phys. Rev. Lett.*, **103** (2009) 147601.
[4] I. Umegaki, et al., *Phys. Chem. Chem. Phys.* **19** (2017) 19058-19066.

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## Did you request an Invitation Letter for a Visitors Visa Application

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