**Li+ ion conductor based on NaBr doped with LiBH4**

Reona Miyazaki1\*, Masatoshi Shomura1, Reina Miyagawa1, Takehiko Hihara1

*Department of Physical Science and Engineering, Graduate School of Engineering,*

*Nagoya Institute of Technology, Nagoya 466-8555, Japan*

\*Corresponding author

Corresponding should be addressed to R. Miyazaki

**Email**:miyazaki.reona@nitech.ac.jp

Address: Gokiso-cho, Nagoya 466-8555

Phone: +81-52-735-5505

Fax: +81-52-735-5505

**Supplementary material**

**1. XRD patterns for NaBr-NaBH4 systems**

NaBr-NaBH4 systems were fabricated in a same procedure with NaBr-LiBH4 systems. XRD patterns of NaBr-NaBH4 systems with the different four compositions are presented in Fig. S1. In a whole compositions, diffraction peaks of rock-salt phase were observed, indicating that these samples are obtained in a single phase.



Fig. S1: The results of XRD measurement for NaBr-NaBH4 systems.

**2. SEM observation of 15NaBr·LiBH4 pellet**

 The facture surface of the pellet of 15NaBr·LiBH4 after conductivity measurement was observed by SEM and the image is presented in Fig. S2. The particles appear to be densely packed. This dense morphology would explain the negligible inter-grain resistance in the AC impedance measurement.



Fig. S2: SEM image of the fracture surface of 15NaBr·LiBH4 pellet after conductivity measurement.

**2. Multiple CV curves for the cell Li | 15NaBr·LiBH4 | Mo foil**



Fig. S3: Multiple CV curves for the cell Li | 15NaBr·LiBH4 | Mo at 423 K