# Article information:

Self-organized hetero-nanodomains actuating super Li+ conduction in glass ceramics | Nature Communications  
<http://libdb.csu.edu.cn/rwt/NATURE/https/P75YPLUPMF4HK6UFF3SX85B/articles/s41467-023-35982-7>

# Article summary:

1. Sulfide electrolytes have been studied for their potential use in all-solid-state batteries, but their low Li+ conductivity has hindered their application.

2. A nucleation-accelerant induced sequential crystallization and heterogeneous growth mechanism is proposed to form hetero-nanodomains with a large proportion of grain boundaries, which can actuate superior Li+ conduction.

3. The highest room temperature Li+ conductivity of 13.2 mS cm−1 among previously reported glass ceramics is obtained, enabling the successful implementation of glass ceramics within a composite cathode for an excellent energy density of 420 Wh kg−1 (by cell mass) and 834 Wh L−1 (by cell volume).

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

This article provides an overview of the research conducted on sulfide electrolytes for their potential use in all-solid-state batteries, as well as a proposed nucleation-accelerant induced sequential crystallization and heterogeneous growth mechanism to form hetero-nanodomains with a large proportion of grain boundaries that can actuate superior Li+ conduction. The article is written in an objective manner and presents both sides of the argument equally, providing evidence to support its claims. It also acknowledges possible risks associated with the proposed mechanism and provides detailed information on the experiments conducted to validate it.

The article does not appear to be biased or promotional in nature, nor does it contain any unsupported claims or missing points of consideration. All claims are backed up by evidence from experiments conducted using advanced characterization techniques such as synchrotron X-ray diffraction (SXRD), static and magic angle spinning solid-state nuclear magnetic resonance (MAS SSNMR), cryogenic transmission electron microscope (cryo-TEM) and electron holography, as well as density functional theory (DFT) calculations and variable-temperature SSNMR.

The only potential issue with this article is that it does not explore any counterarguments or alternative explanations for the observed phenomena. However, given that this is a research paper rather than a review article, this omission is understandable.

# Topics for further research:

* All-solid-state battery
* Sulfide electrolyte
* Nucleation-accelerant
* Sequential crystallization
* Heterogeneous growth mechanism
* Li+ conduction mechanism

# Report location:

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