

RECENT PROGRESSES ON LITHIUM SALTS OF PERFLUORINATED SULFONIMIDE ANIONS FOR RECHARGEABLE LI AND LI-ION BATTERY

Heng Zhang, Liping Zheng, Qiang Ma, Pengfei Cheng, Wenfang Feng, Jin Nie, Zhibin Zhou*
Key laboratory of Material Chemistry for Energy Conversion and Storage (Ministry of Education), School of Chemistry and Chemical Engineering, Huazhong University of Science and Technology, 1037 Luoyu Road, Wuhan 430074, China

zb-zhou@mail.hust.edu.cn

In the present work, we report recent progresses on lithium salts based on various kinds of perfluorinated sulfonimide anions (see Figure 1) as conducting salt for Li and/or Li-ion batteries. We will cover a wide range of electrolytes of these new anions from non-aqueous liquid (including conventional carbonate solutions, ionic liquids, and molten salts) to solid polymer electrolytes (including classic lithium salt/PEO, and single Li-ion conducting polymer based on polyanions).

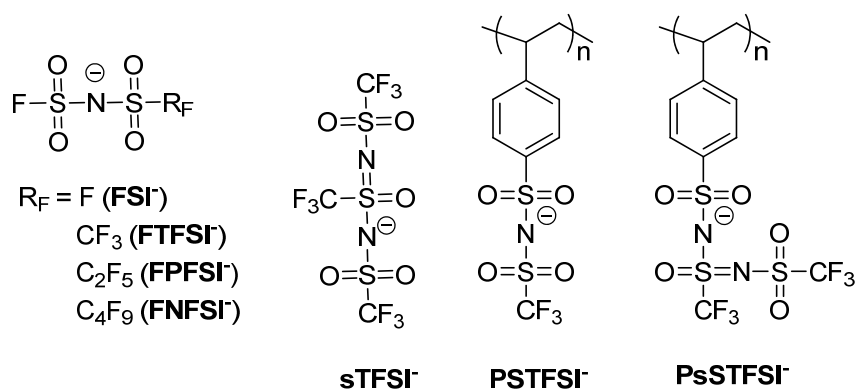


Figure 1. Structures of various kinds of perfluorinated sulfonimide anions.

In liquid carbonate electrolytes, both LiFSI and LiFNFSI as conducting salt or additive for improving the high-temperature performances of Li-ion cells will be discussed. In both ionic liquid and molten salt electrolytes, the electrochemical performances of natural graphite/LiFePO₄ Li-ion cells will be detailed. In solid polymer electrolytes, the electrochemical performances of Li/LiFePO₄ cells will be described. The mechanisms behind the improvements of electrochemical performances of Li and Li-ion cells by using these lithium salts will be discussed, in terms of various chemical, electrochemical and surface analyses.