

Electrochemical Characteristics of Liquid Electrolytes Having Anion Receptors for Rechargeable Lithium Batteries

음이온 고정화 물질이 도입된 액체 전해질의
전기화학적 특성에 관한 연구

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Rechargeable lithium batteries have become the most powerful energy storage system mainly due to their higher energy density and operating voltage. Recently, intensive efforts have been to the search for new and advanced electrolytes (new salts, solvents, and additives) which can totally use the theoretical capacity of commercial electrode material.

Various additive materials have been added to the conventional liquid electrolytes consisting of organic solvent mixtures of ethylene carbonate (EC) with dimethyl carbonate (DMC) and/or diethyl carbonate (DEC) with lithium salts to enhance the electrochemical performance and safety of rechargeable lithium batteries. Those additives with small amount less than 5wt% have known to be very effective to form stable SEI(Solid Electrolyte Interphase) layer or to enhance safety by preventing overcharge or flame generation. Among various additives, anion receptors have been newly under research for LiPF₆-based electrolyte system to enhance high temperature cyclability. In this work, we report the electrochemical characteristics of liquid electrolytes having various anion receptors such as TPFPB [Tris (pentafluorophenyl) borane]. We used impedance spectroscopy, FT-IR, ¹¹B-NMR, DSC, and XPS techniques especially to reveal the interaction mechanism of anion receptors.