Electrochemical Performance of Functional Sulfite-type Electrolyte Additive for Lithium Metal Battery

Jinsol Im [a], Jinhyeok Ahn [a], Eun-Kwang Jang [a], Kuk Young Cho [a]
[a] *Hanyang University, Engineering Building V, #423, 55 Hanyangdaehak-ro, Sangnok, Ansan-si, Kyeonggi-do, Republic of Korea*

E-mail: *jinsol.im@gmail.com*

Rechargeable lithium batteries are the most effective system of energy supply for electric vehicle and various other electronic devices.[1] With the increases for demand of energy, a lot of materials are being developed that have a large capacity relative to the reference weight or volume. Especially, among the negative electrodes, lithium metal is known as a material having the highest energy density and a potential gap. However, the use of lithium metal electrode causes problems such as dendrite growth on the lithium surface, safety problems, and cycle efficiency. It is very important to inhibit dendrite growth for practical use because of the potential risk due to the short circuit between cathode and anode. To solve this problem, the surface modified, coated ceramic layer, and functional additive were used. The method using the electrolyte additive improves the cell performance by making the stable surface of the lithium metal. Previously, the surface of a lithium anode was stabilized using vinyl carbonate (VC)[2] and fluoroethylene carbonate (FEC)[3], which are known to be functional additives in the anode. In this work, we investigate the safety and stability of lithium metal using functional sulfite-type additives, which have been previously reported[4], and how it effects to lithium anode through electrochemical performance test.

References:

[1] K.Xu, Chem. Rev. 114 (2014) 11503–11618.
[2] H. Ota, K. Shima, M. Ue, J-i. Yamaki, Electrochimica Acta 49 (2004) 565-572.
[3] E. Markevich, G. Salitra, D. Aurbach, ACS Energy Lett. 2 (2017) 1337-1345.
[4] S. H. Lee, S. Yoon, E-H. Hwang, Y-G. Kwon, Y-G. Laee, K. Y. Cho, J. Power Source 378 (2018) 122-118.