# Organometallic halide as an additive for reduction of the reactivity of Li towards organic electrolyte.

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Organometallic halide as an additive for enhancing of Li cycling efficiency was investigated. Electrolyte modification using additive has been considered as an effective approach to modification of the surface film on Li metal and improving Li cycling efficiency. A number of different compounds including gaseous species, surfactant, organic and inorganic compound have been adopted at modifying Li metal/organic electrolyte interface. [1]

Ishikawa et al. reported that inorganic additives such as metal iodide (e.g. $AlI_3$, $MgI_2$) enhanced the cycling efficiency of Li. [2~4] From their results, Li-M(M=Al, Mg etc.) alloy layer formed by a charging process at the surface of Li metal anode and suppressed the reaction between anode and organic electrolyte. From the viewpoint of thermodynamics, the activity of Li in Li-M alloy phase is less than unity. Therefore, Li-M alloy layer formed on the surface of Li metal could reduce of the reactivity of anode towards organic electrolyte. These lithium-alloy forming agents are commonly used as a form of inorganic salts such as metal iodide, chloride, perchlorate etc. However a little works on the utilization of organometallic compounds as alloy-forming additive have been done. Here we will report firstly on the organometallic additives for reducing the reactivity of Li metal towards organic electrolyte and improving the cycling efficiency of Li.

Fig. 1 shows the effect of the addition of new agent, triphenylsilyl chloride (TPSC) on the cycling efficiency of Li metal anode. Compared with simple inorganic salts, TPSC showed remarkable enhancement of Li cycling efficiency.

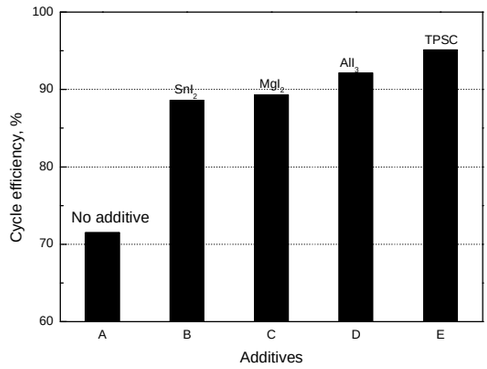


Fig. 1 Li cycling efficiency of organic electrolyte with the addition of various Li-alloy forming agents.

References

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