

## Investigation on properties of Lithium Phosphorus Oxy-nitride (LiPON) films deposited by metal-organic chemical vapor deposition (MOCVD)

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Lithium phosphorous oxy-nitride (LiPON) thin film electrolytes have drawn much interest in solid state thin film batteries due to its moderate Li-ion conductivity ( $\sim 10^{-6}$  S/cm) and stability upon contact with Li anode. Li-sulfide and Li-oxide electrolytes have higher Li-ion conductivity ( $10^{-3} \sim 10^{-4}$  S/cm) and thus, recently, there are many efforts to use them in solid state batteries. But, both electrolytes are known to be easily decomposed around the potential of 5 V and very chemically unstable in contact with a Li metal anode. One of the common problems encountered in the development of LiPON thin film electrolytes is the relatively low deposition yield and crack formation on the cathode.

In this study, LiPON thin films were deposited by MOCVD technique, and parametric investigation was conducted to enhance the growth rate of LiPON thin films by varying the deposition conditions. Organometallic precursor for LiPON films were  $\text{Li}(\text{C}_{11}\text{H}_{19}\text{O}_2)$ , (Li (DPM)) and  $\text{PO}(\text{C}_2\text{H}_5\text{O})_3$  (TEP).  $\text{N}_2$  was used as a carrier gas and  $\text{NH}_3$  was the nitridation gas. Structural and stoichiometric properties of the LiPON thin films were analyzed by standard measurement techniques such as XRD, SEM, XPS.