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**TITLE:** PVdF-HFP/PMMA blend based polymer electrolytes for Lithium Batteries.

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Lithium is a highly reactive element and a large amount of energy is stored in its atomic bond which is translated into high energy density of the battery. The advantages of using a lithium ion battery over any other type of battery is that it is fairly light compared to other rechargeable batteries of the same size due to the lightweight materials of the electrodes being carbon and lithium. They are also able to hold their charge for a longer period of time and they do not have to be totally discharged in order to recharge. Lithium ion batteries also have a long cycle life in that they can be charged and discharged several times. In this study the properties of polymer electrolyte films based on the blend of poly(vinylidene fluoride-co-hexafluoropropylene) (PVdF-HFP) and poly(methyl methacrylate) (PMMA), ethylene carbonate/ propylene carbonate/ Diethyl Carbonate (PC/EC/DEC), as a plasticizer and bis(trifluoromethanesulfonimide)  $((CF_3 SO_2)_2 N- Li^+)$ , as the lithium salt, was investigated. The films were then analyzed using EIS and SEM in order to determine the effect of the polymer, salt, plasticizer and inorganic additive on the electrolyte. This was then compared to the binary system of the two polymers.