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TITLE: **Lithium Based Ternary Composite Electrolytes for Lithium Batteries**

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Demand for portable electronic devices has reached an unprecedented level in the last two decades and this has catapulted technological improvements in rechargeable batteries. Lithium-ion batteries offer a more flexible and lightweight design, higher energy density and longer lifespan than their battery counterparts. Since the electrolyte is the means of transportation of ions in an electrochemical cell, its role is critical. Ternary composite lithium based electrolytes has been synthesized using polyethylene oxide (PEO), Lithium trifluromethanesulfonic acid (Lithium Triflate) and fumed Silica and are studied. Binary Composite containing PEO, Lithium triflate and fumed silica has also been synthesized. Conductivity of these electrolytes has been measured over wide temperature range using impedance spectroscopy technique and compared with binary electrolytes. Scanning Electron Microscopy (SEM) and XRD are also used to understand the phenomenon's going on in these electrolytes.