# Synthesis and thermal properties of complex macromolecular architectures based on poly(styrene oxide) and poly(ethylene oxide)

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Lithium-ion batteries (LIBs) are the main choice of commercial industry when it comes to supplying power to portable devices. As a result, the development and production of LIBs has known a tremendous development in recent years. Modern LIBs consist of lithium salts dissolved in a liquid electrolyte, which stands between two electrodes. Despite the high ionic conductivity, the use of a volatile and highly flammable organic solvent with metal lithium raises concerns of safety that originate from the possible leaking and combustion of said solvent, due to cell overheating. This crucial disadvantage can be circumvented by replacing the solvent with solid polymer electrolytes (SPEs),that means polymer electrolytes without organic solvents, which can improve the safety of this technology considerably. Materials based on poly(ethylene oxide) are considered ideal for matrixes or additives in such applications. Linear poly(ethylene oxide), though, is inferior due to its high degree of crystallinity below its glass transition temperature and its poor mechanical strength in higher temperatures.

Based on recent studies on the relation between structure and crystallinity of complex macromolecular architectures, we synthesized brush like copolymers based on poly(ethylene oxide) and poly(styrene oxide) that will, in theory, show a smaller degree of crystallinity, when they are used as matrixes or additives in linear poly(ethylene oxide) in conjunction with lithium salts.

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