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## Tentative Outline

**Special Thematic Issue for the journal *Current Applied Polymer Science***

### Polymer Electrolyte

*Sectional Editor: Chi-Ping Li*

• **Scope of the Thematic Issue:**

The polymer-based electrolyte is mainly a salt which dispersed uniformly in a polymer matrix. When the salt is dissociated, it provides one cation and one anion. Through utilizing the chemical interaction between the cation and the polymer molecular chain, the cation, such as lithium or sodium cation, can be shuttled between cathode and anode. Therefore, the polymer electrolyte is a material that capable of ionic conduction. The advantages of polymer electrolyte are avoiding the leakage, volatility and complicated process of the liquid electrolyte.

The polymer-based electrolytes commonly consist of solid polymer electrolytes and gel polymer electrolytes. The solid polymer electrolyte usually based on polyethylene oxide and polypropylene oxide. However, the higher crystallinity of the polymer, the lower ionic conductivity. Through increasing the amorphous portion in the polymer, the ionic conductivity is improved. Inorganic fillers, such as TiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, or SiO<sub>2</sub>, are normally added into the polymer and form composite polymer electrolyte to enhance the mechanical properties and/or the ionic conductivity. The gel electrolyte mainly utilizes organic solvent as a plasticizer other than a salt and host polymer. Consequently, the physical form of the electrolyte changes from solid to gel. This gellification of the electrolyte promotes the interfacial contact with the electrodes. Copolymer such as poly(vinylidene fluoride–hexafluoropropylene) can assist conquer the reduction of mechanical properties while maintaining a great ionic conductivity.

The issue will cover the applications of polymer electrolytes comprise of batteries, supercapacitors, electrochromic devices, sensors, solar cells, fuel cells and actuators, et.al. Due to the fields of their requirement, the optical properties, mechanical properties and electrochemical properties are the focus of the research.

**Keywords: batteries, supercapacitors, electrochromics, sensors, solar cells, fuel cells, actuators**

#### Sub-topics:

- gel polymer electrolyte
- solid-state polymer electrolytes
- block copolymer electrolytes
- composite polymer electrolytes

#### Schedule:

- ✧ Thematic issue submission deadline: **October 2022**

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