Electroactive Polymers for Innovative Energy Devices

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Polymers and organic materials and energy storage devices have attracted a massive attraction due to the foreseeable optimistic forecast for accomplishing reliable, light weight and flexible characteristics along with pertinent performances as promising resources of energy and power. Conventional battery and supercapacitor have been considered as for the primary energy and power sources for modern electronic devices and vehicles in mobile era, respectively until the limitation in the energy and power of the energy storage systems was assessed to be a critical issue for addressing universal solution for future energy needs. In order to correspond to the needs in a good manner, niche energy and power sources have been developed using 25-year relevant innovation experience covering state-of-the art advanced materials development and the energy storage and conversion devices.

The discovery of superb electrochemical characteristics from advanced energy materials including organometallic materials, nano-crystals, carbon materials and electroactive polymers (EAPs) has triggered off massive attraction, bringing out a remarkable accomplishments over the past decades. Facile modulation of electronic and electrical characteristics for the advanced EAPs varying the molecular structure has offered outstanding merits for developing innovative energy storage and conversion systems. Elucidation of structure and property relationship of the EAPs that include fluorescent polymers, conjugated polymers, variable band gap polymers and electrical conductive polymers has been observed to be a solid platform to assess foreseeable innovation in the development of energy devices using advanced analytical tools of chemical, electrochemical, electrical, mechanical, optical analytical methods.

Nanotechnology was employed for processing the advanced materials and corresponding innovative prototypes of bio, nano, electronic, electrochemical and energy technology. Innovation in EAP and nanotechnology-initiative energy storage systems will be mainly addressed and followed by the perspectives of the innovation for motivating talented innovators at SKKU to accomplish the world best performing high energy and high power energy storage system, Super Battery, for which the corresponding technology will feed us over next 20 years.