My research group @ School of Chemistry deals with two projects: (i) Dielectric Polymer Ceramic Nanocomposites for Capacitor Applications and (ii) Thermoset Composites for Potential Coating Application and Its Effect on Cross-linking behaviour.

**Polymer Ceramic Nanocomposites for Capacitor Applications:**
In order to make the materials suitable for applications in high-energy capacitors, we expect to achieve the high dielectric constant and low loss by developing a polymer-ceramic nano-composite material. We also expect the dielectric constant of the composites will be much higher than in the virgin polymer, while retaining high dielectric strength and resistivity. There are several advantages over traditional high dielectric ceramics, which suffer from degradation and high leakage currents at high fields, in-spite of their large dielectric permittivity. This will provide an opportunities to the scientific community to make a road map for the development of emerging material as per as end use performance in the field of device applications.

**Thermoset composites for coating applications:**
Nanostructured thermoset block co-polymeric nanocomposite materials are widely used in recent years due to their important properties such as strength, stiffness, rheological properties and flexible behaviour. Polymer matrix must have good process ability so that dispersed particles in the nanometer range can result large improvement in composite properties. Similarly, the incorporation of block co-polymer (nano-filler) in to polymers can render greater reinforcement efficiency than conventional composites with micro filler. The presence of naofillers enhances the modulus of rigidity, thermal stability and barrier properties. Generally, the thermoset block co-polymeric nanocomposite materials are two phase systems in which the fillers are dispersed in polymer matrix in nanometer scale. In the nanostructured block co-polymer such as PE-PEO (Polyethylene-polyethylene oxide), PS-PEO (Polyethylene-polyethylene oxide), the polyethylene and polystyrene are hard phase and the polyethylene oxide are soft phase. Thus, the attention will be focused on development of nanostructured thermoset block co-polymeric nanocomposite for various industrial, technological coating applications with respect to curing behaviour.

**Total Publications: 23**

**Significant Publications**