

## **Multifunctional properties ferroelectric polymer-ferrite composites**

Materials with multifunctional properties are very fascinating and are getting substantial research attention. Magnetoelectric (ME) multiferroics have been identified as a promising multifunctional materials that simultaneously exhibits both magnetic and ferroelectric properties, and are found suitable for applications in diverse fields. In the context of device applications, multiple properties (magnetic and ferroelectric properties) and the coupling between the (magnetic and ferroelectric) orders are very useful, providing new opportunities and freedom for device design. Different strategies have been reported to realize compounds with promising multiferroic properties at or above ambient temperature. Even though various polymers exhibit ferroelectric/piezoelectric properties, fluoropolymers such as PVDF and its copolymers - PVDF-HFP and PVDF-TrFE stand out due to their exceptional ferroelectric/piezoelectric properties. By using polymer as a phase, flexible multiferroics materials with remarkable magnetoelectric property can be realized. However, under normal conditions, PVDF and its copolymer - PVDF-HFP were found to possess mixed crystalline phases ( $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$ , and  $\epsilon$ ). In order to maximize the ferroelectric nature of PVDF and PVDF-HFP various strategies such as heat treatment, mechanical stretching, poling, the introduction of different fillers and electrospinning were commonly used, which enable the reorientation of the polymer chains to the  $\beta$  phase configuration.

In this talk, I focus on the details of the development and study of PVDF and its co-polymers based composites having multifunctional traits.