Contribution ID: **143** Type: **Poster presentation**

Strongly Enhanced Dielectric Response and Dielectric Relaxation in $BaTiO_3$/poly(vinylidene fluoride) Nanocomposites

Thursday, 21 May 2015 13:00 (3h 30m)

In this research work, the $BaTiO_3$/poly(vinylidene fluoride) (BT/PVDF) nanocomposites were prepared by a solution processing method using spherical BT nanoparticles (<100 nm) with different volume fractions (f_{BT} = 0−0.4). The microstructure of the nanocomposites was characterized by scanning electron microscope. It was found that the strong agglomeration of BT nanoparticles with large spherical cluster of about 10-30 μm in diameter was formed in the microstructure. Dielectric relaxation behavior in BT/PVDF nanocomposites was investigated at room temperature using a simple parallel capacitor technique. The strong low-frequency dependence of the dielectric permittivity was observed in the BT/PVDF nanocomposites, especially for high-loading BT nanoparticles. This was accompanied with the appearance of the relaxation peak of the loss tangent. The dielectric permittivity and loss tangent values at 10^3 Hz of the BT/PVDF nanocomposites with f_{BT} = 0.4 were found to be 623.3 and 0.887, respectively. This enhanced dielectric permittivity is significantly larger than that of the PVDF polymer matrix by a factor of about 50. The strongly enhanced dielectric response was described based on the strong dipole polarization in the large clusters of agglomerated BT nanoparticles and the interfacial polarization at the large interface area of PVDF thin layer between BT clusters.

Primary author: Ms SILAKAEW, Kanyapak (Materials science and Nanotechnology Program, Faculty of Science, Khon Kaen University, Khon Kaen, THAILAND 40002)

Co-authors: Dr THONGBAI, Prasit (Department of Physics, Faculty of Science, Khon Kaen University, Khon Kaen, THAILAND 40002); SAIJINGWONG, Wantana (Department of Physics, Faculty of Science, Khon Kaen University, Khon Kaen, THAILAND 40002)

Presenter: Ms SILAKAEW, Kanyapak (Materials science and Nanotechnology Program, Faculty of Science, Khon Kaen University, Khon Kaen, THAILAND 40002)

Session Classification: Poster-3

Track Classification: Material Physics, Nanoscale Physics and Nanotechnology