Recently, expanded graphite (EG) is attracting considerable interest as a nanoadditive for polymer matrix due to its extraordinary characteristics [1]. Poly(vinylidene fluoride) (PVDF) is a technologically important polymer because of its high dielectric constant, mechanical strength, and resistance to solvents, acids, and bases. PVDF having a repeat unit of [-CH2–CF2 -] is known to exhibit at least four crystalline phases, known as α, β, γ, and δ [2]. Moreover, it is known that improved electrical performances such as high dielectric constant, piezoelectricity and pyroelectricity are obtained if PVDF presents β-phase and, to a lesser extent, γ-phase.

For this work, nanocomposites based on PVDF and EG, with different compositions, have been prepared. A comprehensive study of this type of composites can be of great importance because of their broad applications in electrochemical systems such as sensors, electromagnetic interference absorbers and high-charge storage capacitors among others.

**EXPERIMENTAL**

Commercial PVDF powder (Aldrich, Spain), with Mw = 534,000 g/mol, was used as polymer matrix, and expanded graphite (SGL Carbon SE, Germany) as a nanoadditive. PVDF was dissolved in N,N-dimethylacetamide (DMA) (Sigma-Aldrich) and different amounts (0.5, 1, 1.5, 1.75, 2, 3 and 4 wt.%) of expanded graphite were also dispersed in DMA. Then, the dispersion EG/DMA was added to the PVDF/DMA solution and subsequently the mixture was precipitated into ice distilled water. Then, films of about 1 mm thick were obtained by compression molding. Scanning Electron Microscopy (SEM), Wide Angle X-ray Scattering (WAXS), Differential Scanning Calorimetry (DSC) and Broadband Dielectric Spectroscopy (BDS) have been used as characterization techniques.

**RESULTS**

With increasing EG content, electrical conductivity can be described by a law of the type [3]:

\[ \sigma (F) = \sigma_{\alpha} + \sigma_{\mu} = \sigma_{\alpha} + A F^c \]

\[ \sigma_{\alpha} \propto F^c, \text{with } S = 0.8 \]

there are significant amounts of polymer interfaces that can contribute to AC conductivity through an inter-cluster polarization mechanism [4]

**REFERENCES**