Electronic Supplementary Information (ESI) Polymer Chemistry

Novel Polymer Nanocomposites from Bioinspired Green Aqueous Functionalization of BNNTs

Materials

The following materials were used in this study: dopamine hydrochloride (Sigma Aldrich), boron nitride nanotubes (BNNTs) and 2-amino-2-hydroxymethylpropane-1, 3-diol (Tris, Aldrich). Ultrapure water (resistivity=18.2 MΩ) was used in the whole experiment.

Characterization

Characterizations of the pristine boron nitride nanotube (BNNT) and dopamine functionalized BNNTs were done using Fourier transform infrared spectroscopy (FTIR), Thermogravimetric Analysis (TGA), Raman Spectroscopy, Field emission scanning electron microscopy (FESEM) and Transmission electron microscopy (TEM).

FTIR Spectroscopy

Fourier Transform Infrared (FTIR) spectra of the pristine BNNTs and graft copolymers were taken on smooth thin films with the help of a Perkin-Elmer system 2000 FTIR; to verify the structural changes in PVDF before and after graft copolymerization. The FTIR spectra were obtained with 16 scans for each measurement over the range of 4000 – 400 cm^{-1} at a resolution of $4cm^{-1}$.

Thermogravimetric analysis (TGA)

Prior to thermal analysis the samples were dried under vacuum at 60 ^{0}C for 24 h and subsequently were stored in a desiccator. TGA curves were recorded on a TA instrument mode 2950 in a temperature range of room temperature to 900 ^{0}C with a heating rate of 10 ^{0}C/ min. TGA runs were carried out on samples having typical weight of 10 - 20 mg.

Raman Spectroscopy

Raman spectra were obtained using Renishaw Invia Raman Microscope with 532 nm Nd: YAG laser.

Field emission scanning electron microscopy (FESEM)

Field emission scanning electron microscope (FE-SEM, JEOL 7600F), operating at 5 kV was employed to determine the surface morphology of the pristine and functionalized BNNTs.

Transmission electron microscopy (TEM)

Detailed structure analyses of the functionalized BNNTs were performed in transmission electron microscopy (TEM, JEOL2010) operating at 200 kV

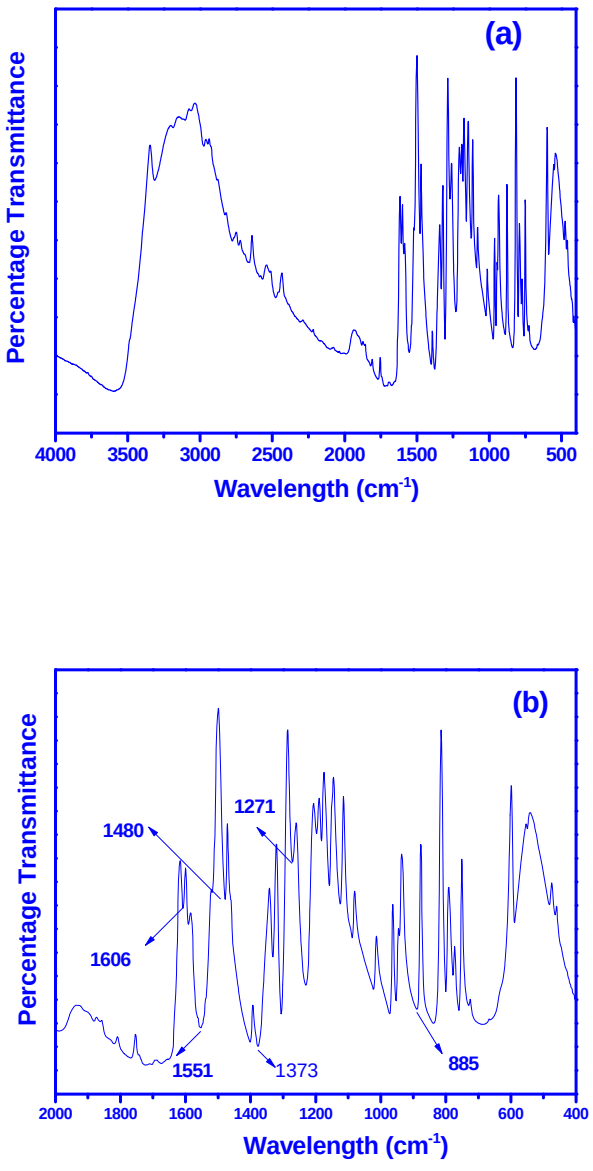

Figure S1: FTIR spectrum of pure dopamine