Supporting information for

Preparation of boron nitride nanosheets via polyethyleneimine assisted sand milling: Towards thermal conductivity and insulation application

Bing Wang, Haifeng Ji, Xiaojie Zhang*, Xiongwei Qu*

Hebei Key Laboratory of Functional Polymers, Department of Polymer Materials and Engineering, Hebei University of Technology, 8 Guangrong Street, Tianjin 300130, P. R. China

Email: xwqu@hebut.edu.cn (X. Qu), zhangxj@hebut.edu.cn (X. Zhang)

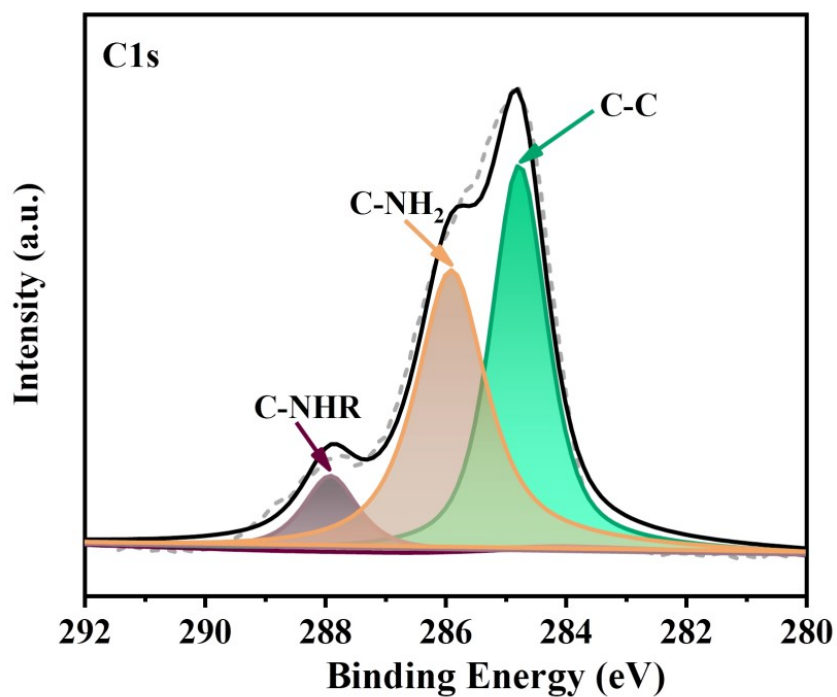# X-ray photoelectron spectroscopy (XPS) Measurements

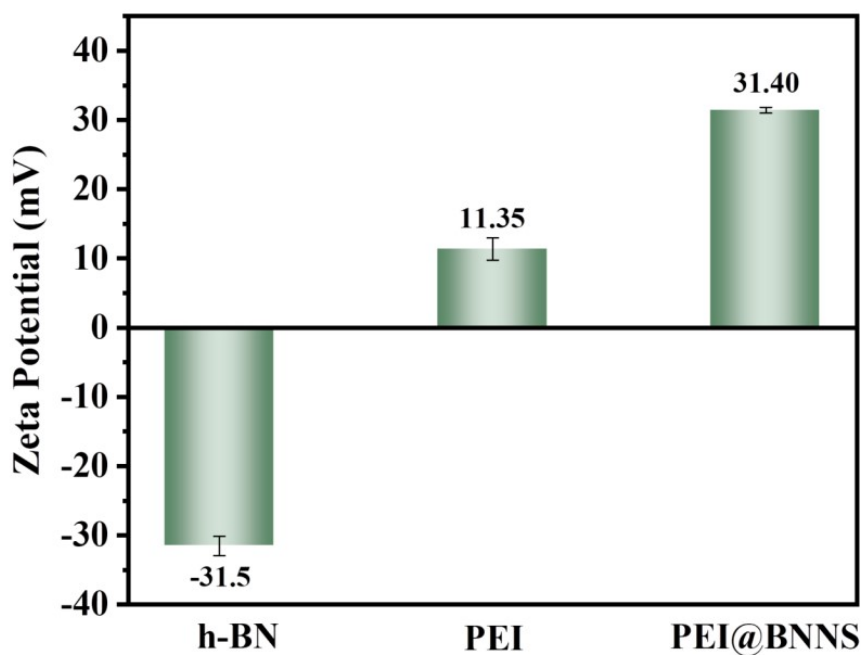**Figure S1** XPS spectra of PEI@BNNS with the high resolution C1s peak-fitting curves.

Zeta Potentials

Figure S2 Zeta potential of h-BN, PEI and PEI@BNNS.

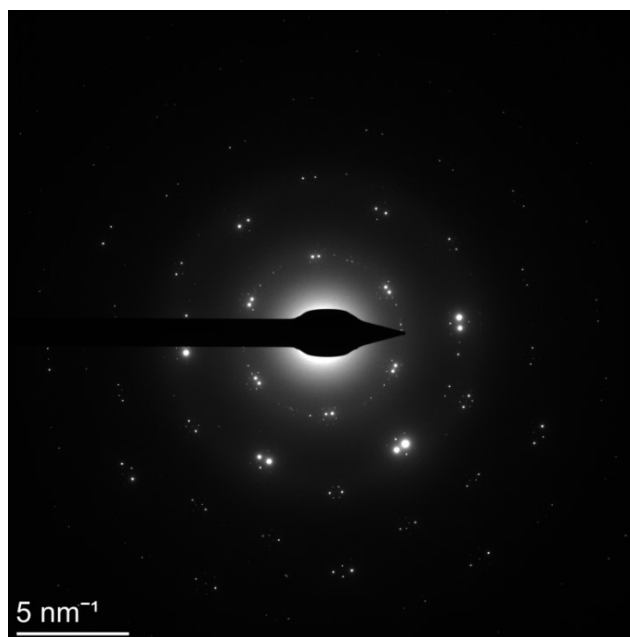# Electron diffraction pattern of the PEI@BNNS

Figure S3 Electron diffraction pattern of the PEI@BNNS.
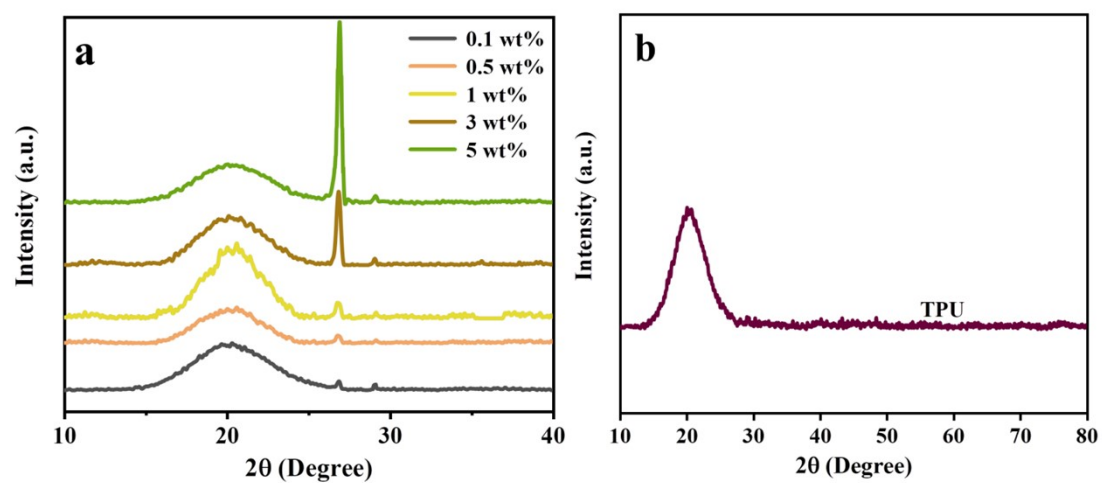
X-ray diffraction (XRD) Measurements

Figure S4 XRD patterns (a) h-BN/TPU composites with different filler loadings. (b) TPU.
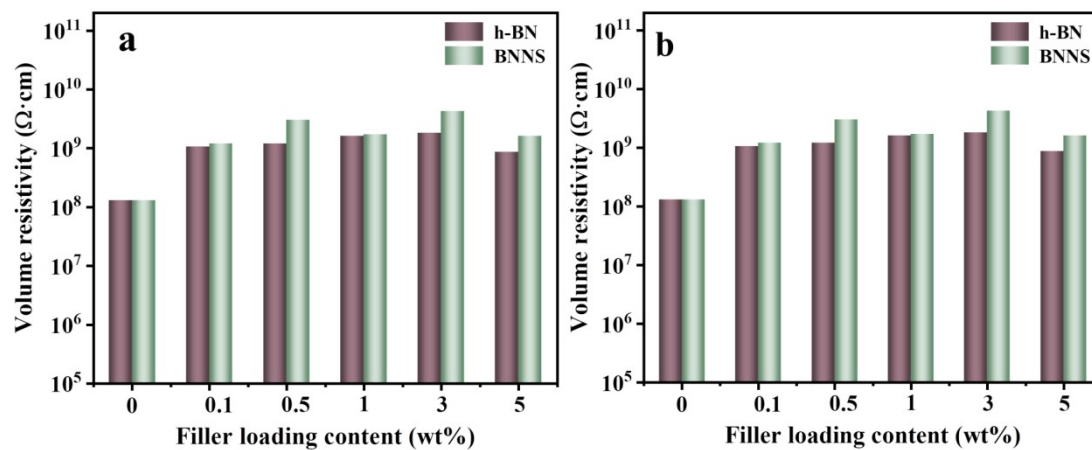
Resistivity Measurements

Figure S5 Volume resistivity (a) and surface resistivity (b) of neat TPU, h-BN/TPU and PEI@BNNS/TPU composites.
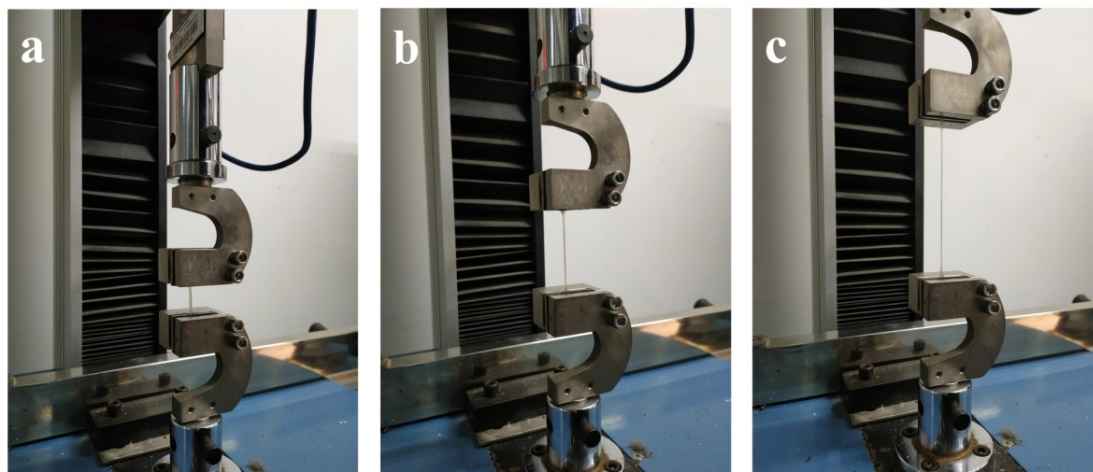
Tensile strength measurements

Figure S6 (a)-(c) 5 wt% PEI@BNNS/TPU composite tensile strength test process.
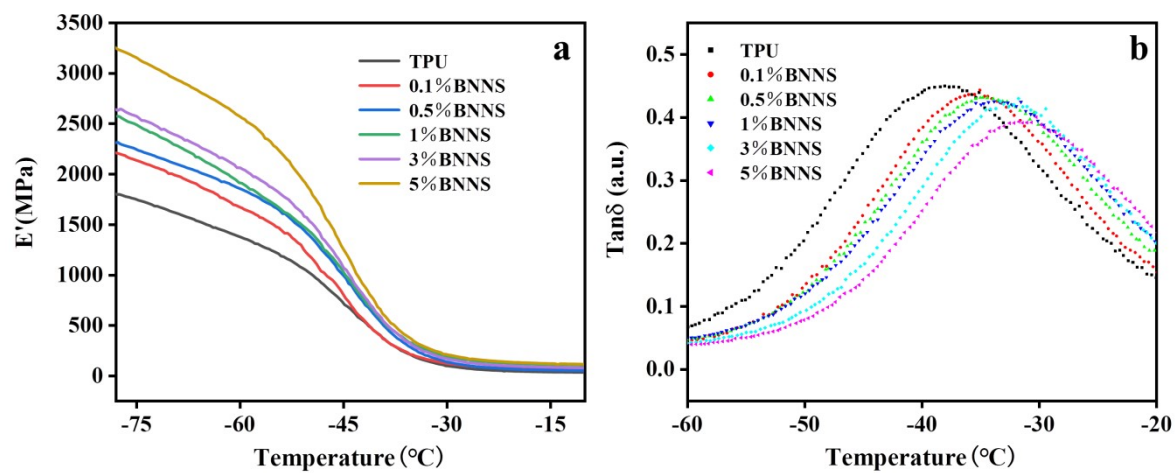
Dynamic Mechanical Analysis

Figure S7 (a) Dynamic mechanical analysis storage modulus (E') and (b) loss factor (tan δ) curves of TPU composites.