

On the improved mechanical properties of ball-milled GNPs Reinforced Short Chain Branched-Polyethylene nanocomposite: Micromechanical modeling and fractography study

Dimitra Kourtidou¹, Konstantinos Tsongas², Maria-Eirini Grigora², Dimitrios Tzetzis², Dimitrios N. Bikiaris³ and Konstantinos Chrissafis^{1,*}

¹ School of Physics, Advanced Material and Devices Laboratory, Aristotle University of Thessaloniki, GR-541 24, Thessaloniki, Greece; dikourti@physics.auth.gr, hrisafis@physics.auth.gr

² Digital Manufacturing and Materials Characterization Laboratory, School of Science and Technology, Inter-national Hellenic University, 14km Thessaloniki, 57001 N. Moudania, Greece; k.tsongas@ihu.edu.gr, megrigora@gmail.com, d.tzetzis@ihu.edu.gr

³ Department of Chemistry, Laboratory of Polymer Chemistry and Technology, Aristotle University of Thessaloniki, GR-541 24, Thessaloniki, Greece; dbic@chem.auth.gr

* Correspondence: hrisafis@physics.auth.gr;

Supplementary Material

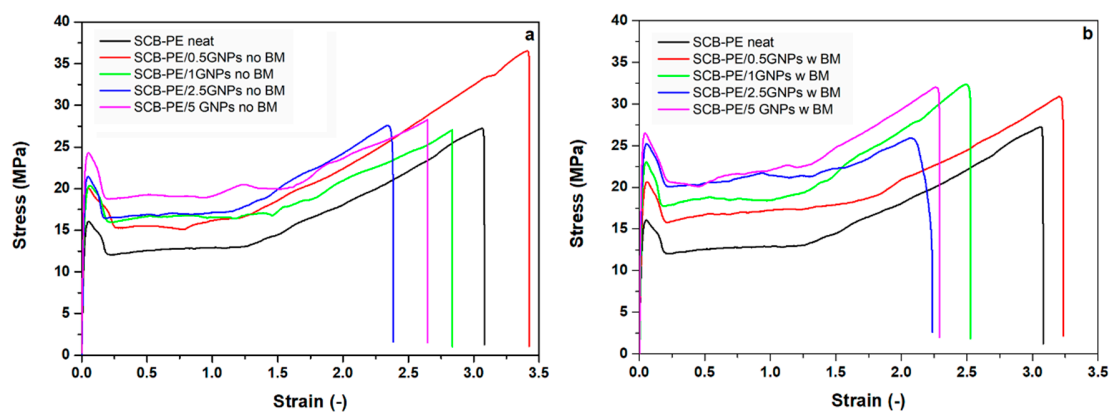


Figure S1. Representative tensile stress vs strain curves of neat SCB-PE, (a) SCB-PE/GNPs no BM and (b) SCB-PE/GNPs w BM nanocomposites.

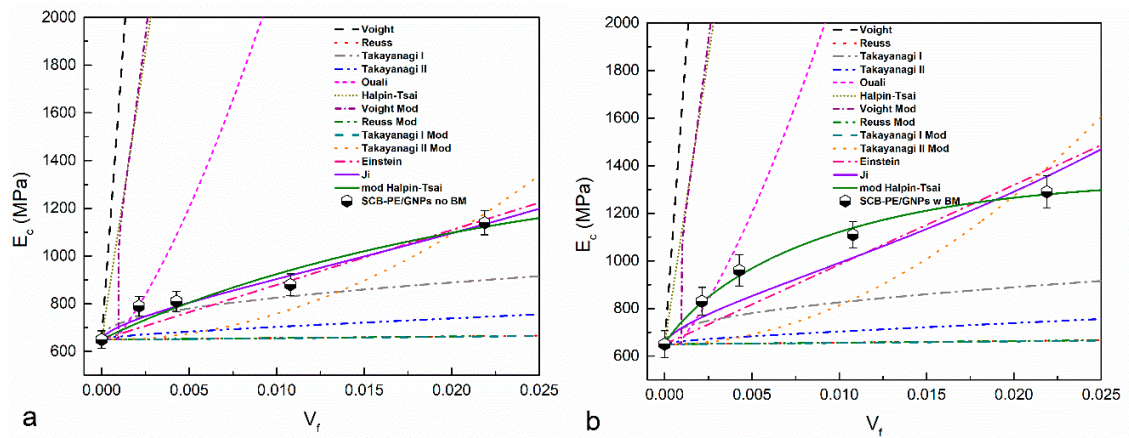


Figure S2. Theoretical modeling of elastic modulus for (a) the SCB-PE/GNPs no BM and (b) SCB-PE/GNPs w BM nanocomposites' experimental data as a function of filler volume fraction, using various micromechanical models.

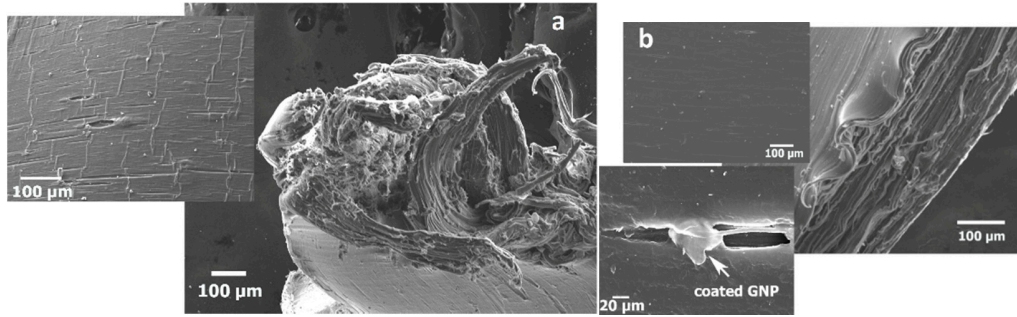


Figure S3. SEM images of the fracture surfaces of (a) SCB-PE/1 GNPs no BM and (b) SCB-PE/1 GNPs w BM.

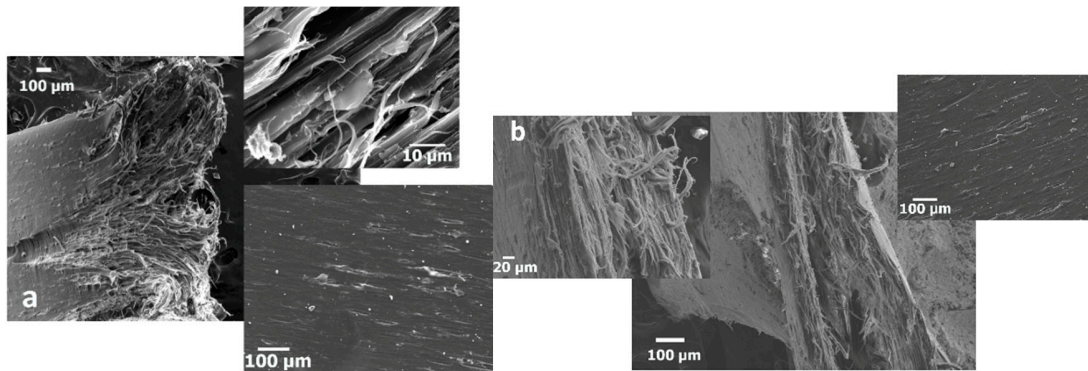


Figure S4. SEM images of the fracture surfaces of (a) SCB-PE/5 GNPs no BM and (b) SCB-PE/5 GNPs w BM.