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Tensile Modulus Measurements of Carbon Nanotube Incorporated Electrospun Polymer Fibers YAVUZ OZTURK, JAEMIN KIM, KWANWOO SHIN, Dep.of Mat.Sci.and Eng., Gwangju Ins.of Sci.and Tech., Gwangju 500-712, Korea. — Electrospinning has become a popular method for producing continuous polymer fibers with diameters in sub-micron scale. By this technique uniaxially aligned fibers can also be obtained, by using two separate parallel strips as conductive collectors. Uniaxial alignment of polymer fibers gives us the chance to well-characterize their structural properties via tensile modulus measurements. Here we report a simple and new technique for tensile testing of polymer fibers which employs a computerized spring-balance/step-motor setup. The key point in our technique is the production of fibers directly on the tensile tester by using two vertical strips as collectors. By this way, even fibers of very brittle nature can be tested without handling them. Calculation of total cross-sectional areas - which is crucial for determining stress values - was done by using scanning electron and optical microscope images for each sample. In this study we have investigated mechanical properties of Polystyrene (PS), Polymethylmethacrylate (PMMA) and PS/PMMA blend fibers; as well as Carbon Nanotube (CNT) incorporated PS, PMMA and PS/PMMA blend fibers. It is expected that the extraordinary mechanical properties of CNTs can be transferred into polymer matrix, by their incorporation into confined space within electrospun fibers. Here we analyzed the influence of CNT on polymer fibers as function of CNT amounts.

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