

604c Electrospun Magnetic Nanofibers with Anti-Counterfeiting Applications

Carola Barrera, Juan P. Hinestroza, and Carlos Rinaldi

Polyethylene oxide (PEO) nanofibers containing discrete magnetic domains have been produced by using a modified electrospinning apparatus. Magnetite and cobalt ferrite nanoparticles were synthesized and coated with thiolated PEO and then suspended in a 1-2 wt% PEO-in-water solution. Nanocomposite fibers with diameters as small as 200 nm were produced through electrospinning. Transmission electron microscopy was used to study particle agglomeration in the resulting nanofibers as a function of particle loading and electrospinning conditions. Magnetic measurements using a SQUID magnetometer were used to characterize the DC and AC magnetic response of the fibers. Applications to anti-counterfeiting in the textile industry by judicious combination of magnetic nanoparticles with widely different AC susceptibilities will be discussed.