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Dielectric/Magnetic Nanowires Synthesized by theElectrospinning Method for Use as High Frequency Electromagnetic Wave Absorber

좌용호†

한양대학교 공학대학 화학공학과

(choa15@hanyang.ac.kr†)

High frequency electromagnetic(EM) waves are increasingly being applied in industries because of saturationat lower frequency bands as a result of huge demand. However, electromagneticinterference (EMI) has become a serious problem, and as a result, highfrequency EM absorbers are now being extensively studied. Also, recentdevelopments in absorber technology have focused on producing absorbers thatare thin, flexible, and strong. Hence, one-dimension ferrous nano-materials area potential research field, because of their interesting electronic andmagnetic properties. Commercially, EM wave absorbing products are made ofcomposites, which blend the insulating polymer with magnetic fillers. Inparticular, the shape of the magnetic fillers, such flaky, acicular, or fibrousmagnetic metal particles, rather than spherical, is essential for synthesizingthin and lightweight EM wave absorbers with higher permeability. High aspectratio materials exhibit a higher permeability value and therefore betterabsorption of the EM wave, because of electromagnetic anisotropy. Nanowires areusually fabricated by drawing, template synthesis, phase separation, selfassembly, and electrospinning with a thermal treatment and reduction process.Producing nanowires by the electrospinning method involves a conventionalsol-gel process that is simple, unique, and cost-effective. In thispresentation, Magnetic nanowire and dielectric materials coated magneticnanowire with a high aspect ratio were successfully synthesized by theelectrospinning process with heat treatment and reduction. In addition toestimating the EM wave absorption ability of the synthesized magnetic anddielectric materials coated magnetic nanowire with a network analyzer, weinvestigated the possibility of using these nanowires as high-frequency EM waveabsorbers. Furthermore, a wide variety of topics will be discussed such as thetransparent conducting nanowire and semiconducting nanowire/tube with theelectrospinning process.

Keywords: Nanowire, Nanotube,Electrospinning, EM Absorber