Synthesis of conductive thin film for electromagnetic interference shielding by using atmospheric-pressure plasma

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Metals and their composites are the most popular materials for EMI shielding. Currently, they are usually deposited by sputtering and electrodeposition. However, there are some inconvenience for their wide application such as expensive vacuum equipment, high voltage, small cell. Recently, we developed a new process for efficiently synthesizing supported metal, core-shell, bimetallic nanoparticles by using atmospheric-pressure plasma. The aim of this technique was to overcome the process restrictions mentioned. We present here, for the first time, the use of atmospheric-pressure plasma reduction to fabricate silver thin film on PET substrate, without using any toxic chemicals, near room temperature for EMI shielding. The formation of conductive thin film is examined using related measurements. The results show that conductive thin films are successfully synthesized by atmospheric-pressure plasma reduction. As the results, the conductive thin films have significant shielding effectiveness of more than 55 dB at 0.1 GHz with near 600 nm thickness. This research was supported by Creative Human Resource Development Consortium for Fusion Technology of Functional Chemical/Bio Materials.