Supporting Information

Design and fabrication of multilayered graded GNP/Ni/PMMA nanocomposite for enhanced EMI shielding behavior

Hye Ji Im[a], Jae Young Oh[a], Seongwoo Ryu[b] and Soon Hyung Hong[a,*]

[a]Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology (KAIST), 291 Daehak-ro, Yuseong-gu, Daejeon, 34141, Republic of Korea

[b]Department of Advanced Materials Engineering, The University of Suwon, 17, Wauan-gil, Bongdam-eup, Hwaseong-si, Gyeonggi-do, Republic of Korea

* Corresponding author e-mail: shhong@kaist.ac.kr

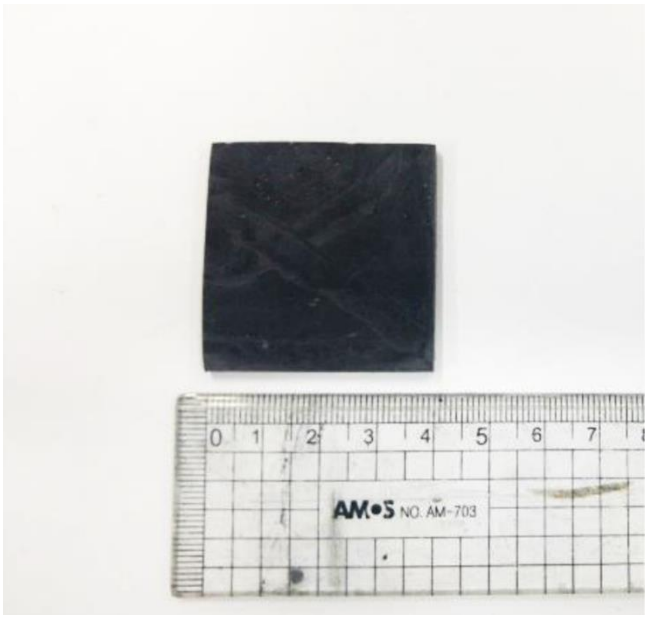

Fig. S1. Sample image of multilayered GNP/Ni/PMMA nanocomposite ({20 wt.% GNP/Ni}/{30 wt.% GNP/Ni}/{40 wt.% GNP/Ni}) (41x41x2.5 mm)

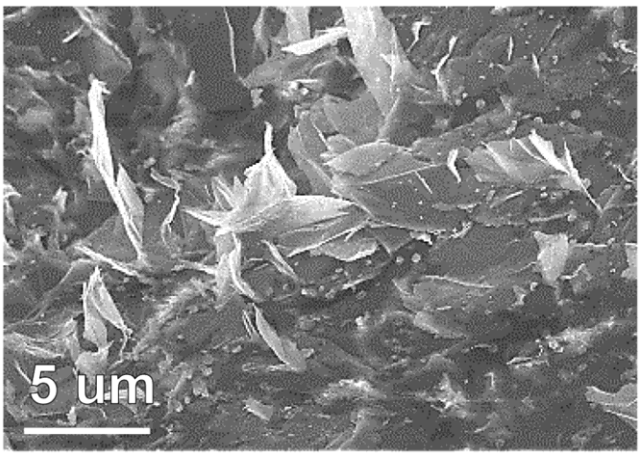

Fig. S2. SEM image of monolayered GNP/Ni/PMMA nanocomposite (30 wt.% of GNP/Ni).

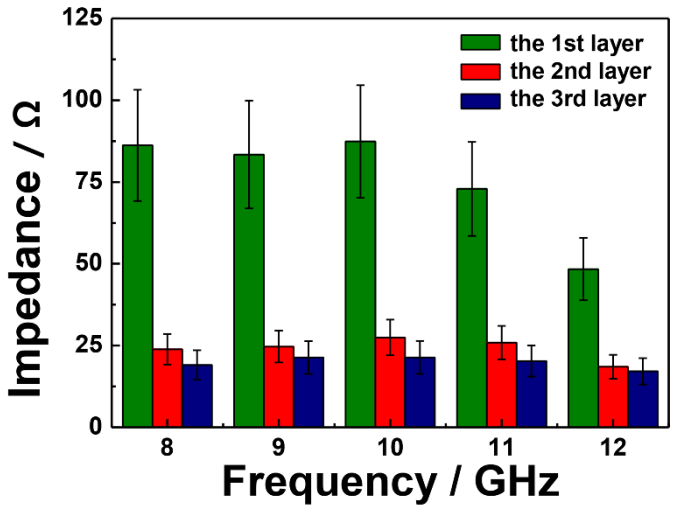

Fig. S3. Impedances for each layer in multilayered GNP/Ni/PMMA nanocomposite ({20 wt.% GNP/Ni}/{30 wt.% GNP/Ni}/{40 wt.% GNP/Ni}) at 8, 9, 10, 11 and 12 GHz; averages are calculated with measured conductivities over six samples and error bars for standard deviation are shown.

Table S1. The thickness, the skin depth at 8 and 12 GHz, and electrical conductivity of each layer in multilayered GNP/Ni/PMMA nanocomposite ({20 wt.% GNP/Ni}/{30 wt.% GNP/Ni}/{40 wt.% GNP/Ni}); average conductivities are measured over six samples.

Concentration of GNP/Ni [wt.%]	Thickness [mm]	The skin depth at 8 GHz [mm]	The skin depth at 12 GHz [mm]	Average conductivity [S/m]
20	0.83	0.58	0.47	29.12
30	0.83	0.44	0.36	139.18
40	0.83	0.24	0.20	412.62