CNT/ PMMA electromagnetic coating: effect of carbon nanotube diameter

Paddubskaya A.G.1, Kuzhir P.P.*,1, Kuznetsov V.L.2,3,4, Mazov I.N.2,3, Moseenkov S.I.2,3, Ishchenko A.V.2,3, Romanenko A.I.3,5, Anikeeva O.B.3,5, Buryakov T.I.3,5

1Research Institute for Nuclear Problems of Belarusian State University, 220030, Minsk, Belarus
2Boreskov Institute of Catalysis SB RAS, 630090, Novosibirsk, Russia
3Novosibirsk State University, 630090, Novosibirsk, Russia
4Novosibirsk State Technical University, 630092, Novosibirsk, Russia
5Nikolaev Institute of Inorganic Chemistry, 630090, Novosibirsk, Russia
*e-mail: polina.kuzhir@gmail.com

In the present communication we focus on the comparative study of the electromagnetic response properties provided by polymethylmetacrylate (PMMA) filled with well purified CVD multi-walled carbon nanotubes of two different mean diameters (9nm and 12-14nm). The effect of smaller diameter together with higher electromagnetic shielding effectiveness has been observed experimentally in Ka-band and interpreted theoretically. Geometry and polarizability of individual filler constituents – the constitutive parameters of nanocarbon assemblies – is addressed here to be pointed out as controllable factors for producing effective electromagnetic coating.

Figure: MWCNT/PMMA EM transmittance versus concentration of MWCNT. The inset figures: frequency dependence of real parts of the permittivity in Ka-band for MWCNT (9 nm diameter)/PMMA samples.

The work was partially supported by the ISTC project B-1708, and the EU FP7 project FP7-266529 BY-NanoERA.