Electromagnetic Wave-Absorbing Coatings Based on Carbon Onions  
(ref. SFP-981051)

Beginning in July 2005, a team of investigators from Belarus, Belgium, Russia and the United States has worked to develop coatings that can efficiently absorb wide-band electromagnetic waves. This could be used as a countermeasure against terrorists who try to use electromagnetic radiation to lock-on to airplanes with surface-to-air missiles or to disrupt their avionics. Electromagnetic wave-absorbing technology can be used to reduce radar signatures. The basic absorbing component is onion-like carbon (OLC), which is produced by the transformation of nanodiamonds. These carbon nanostructures have specific properties that make them ideal materials for electromagnetic wave absorption. The goal is to embed OLC in a polymer layer, which would then be deposited on the surface of the device to be protected. The project participants have worked together to develop methods to purify nanodiamond aggregates of defined size and surface group composition, and they have searched for ways to incorporate OLC and OLC-based nanocomposites into polymer matrixes and films. Nanodiamond fractions have now been developed and a series of OLC-polymer composites has been fabricated. Films with nanodiamonds have also been fabricated. Test results confirmed earlier assumptions that OLC is an efficient shielding material for electromagnetic interference in the 12-230 THz range. A US Patent application was filed in January 2006.

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