FULLERENES AS NANOMATRIX FOR COLLISION MECHANISM TO DETERMINE IN GUNSHOT RESIDUES

SLUŠNÁ Lenka, HALÁSZOVÁ Soňa, PROCHÁDZKA Michal, STUPAVSKÁ Monika, JERIGOVÁ Monika, VELIČ Dušan

Comenius University in Bratislava, International Laser Center in Bratislava, Bratislava, Slovakia, EU

Abstract

Forensic chemistry is rapidly developing and it is of high interest for crime investigations. Secondary ion mass spectrometry is very sensitive technique which is used to determin gunshot residues. Gunshot residues are in very low concentration and therefore fullerene nanomatrix is used to enhance ion yield. Fullerene, as potentially useful materials for nanotechnology, utilize spherical shape composed of inert atoms for collision mechanism. Fullerenes are dissolved in toluene and deposited as 10, 20 and 30 depositions to form the nanomatrix. Gunshot residues are deposited on the nanomatrix. The dependence of intensity of selected ions on the number of fullerene layers is studied. The yield of ions change with number of fullerene layers. The most important ions are Pb+ and isotops 206Pb+, 207 Pb+, then PbO+, Sb+, Ba+, which originate from a primer of the cartridge. Ions of Mg+ and Ca+ are from stabilizers. Organic compounds are also detected, dimethyl phthalate (C10H10O4+) and diethyl phthalate (C12H14O4) in very low concentrations, while the rest is burned by shot. Secondary ion mass spectrometry is a useful analytical technique in forensic chemistry, however wwith a modification of samples with fullerene matrix.

Keywords: Fullerenes, Gunshot Residues, Secondary Ion Mass Spectrometry, Matrix

Author did not supply full text of the paper/poster.