



Contribution ID: 57

Type: Poster

P78 - Elemental Characterization of Gunshot Residues Generated by Brazilian Manufactured Ammunition

Friday, 11 July 2014 13:00 (1 hour)

The findings of GSR (waste shooting of a firearm) in the hands or clothing of a suspect is of high interest for police authorities. These residues identified by the presence of Pb, Ba and Sb in a single particle of generally spherical geometry stem from the condensation process of material from the primer, projectile, cartridge case and the gun barrel. Therefore, its composition varies according to the gun and the ammunition used.

The most accepted technique for the detection of GSR in Brazil nowadays is the Scanning Electron Microscope Energy Dispersive X-Ray Spectrometry (SEM-EDS) since it is a non-destructive technique and capable of specifying whether the characteristic elements (Pb, Ba and Sb) are in the same particle, thus discarding the possibility of contamination from another source. However, in most cases, is not possible to discriminate waste from different sources using SEM, because this technique is not sufficiently sensitive to trace elements. The objective of this study is to establish the elemental characterization of GSR generated by ammunition made in Brazil, and determine the level of dependence of its composition with the firearm and the corresponding ammunition used during the firing. To that end, PIXE and micro-PIXE experiments were carried out.

GSR samples from the firing of a Taurus (gauge 38 special), with cartridges CBC (38 SPL+P+) were collected on paper which served as an aim. The measurements were performed at the Ion Implantation Laboratory of the Physics Institute (UFRGS). The samples were irradiated with an average current of about 100 pA and 2 nA for the micro-PIXE and PIXE experiments. Preliminary results show a moderate degree of correlation between the GSR and the ammunition.

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Session Classification: Poster Session with Cheese and Wine