

## Analytical tools for the forensic profiling of fireworks

Carlos Martín-Alberca

Division of BioAnalytical Chemistry, Amsterdam Institute for Molecular and Life Sciences (AIMMS),  
Vrije Universiteit Amsterdam,

Forensic profiling of fireworks goes beyond chemical identification of the explosive material of a piece of evidence. It aims to provide key intelligence to a forensic investigation on the basis of chemical clues in the form of traces, impurities and degradation products. These could give insight in characteristic profiles (individualization), or link samples obtained from a crime scene and material associated with a suspect. This presentation will outline new analytical strategies and tools that recently have been proposed in the framework of *Pyroprof* (European funded research project).

1. Fit-for-purpose IC-ESI-MS methods for the quantification of 40 ions related to pre- and post-blast firework powders and fuses, allowing individualization of similar kinds of fireworks.
2. New method for pinpointing the geographical origin of a piece of firework by portable XRF and chemometric analysis.
3. The establishment of background chemical levels of ions related to inorganic explosives in the Netherlands allowing better interpretation of this type of evidence.
4. The set-up of a new database with Geographical-Information-System functionality displaying levels of ions of interest on specific spots in the Netherlands.

The developed tools and knowledge provide the forensic expert the possibility to implement chemical profiling of inorganic explosives for solving regular case work.