

## Nuclear Forensics –Combining Research, Application and Investigation

Nuclear forensics is defined as “Nuclear forensics is the examination of nuclear or other radioactive material, or of evidence that is contaminated with radionuclides, in the context of legal proceedings under international or national law related to nuclear security. The analysis of nuclear or other radioactive material seeks to identify what the materials are, how, when and where the materials were made, and what their intended uses were.”

Nuclear forensic science has emerged as a relatively new and fascinating multidisciplinary area of research, combining methods of traditional forensics, radiochemistry, analytical chemistry, material science, isotope geochemistry, and nuclear physics. By providing examples of real incidents, the presentation will illustrate the evolution of this discipline from an ad-hoc analysis to a matured discipline with remarkable capabilities. It should be noted, though, that nuclear forensics first of all provides a comprehensive characterization the material which includes the measurement of isotopic composition, elemental composition, chemical impurities and morphology. These parameters can best be understood by comparing them against data of material of known history. Such an evaluation may either consist in a direct comparison of data (i.e. database query seeking for matching records) or it may consist in point-to-model comparison (i.e. comparing analytical results to model calculations). These findings provide investigative leads to law enforcement or other competent authorities; they might also allow drawing conclusions on the possible origin of the material.

The development or adaptation of analytical methods and the quest for signatures characteristics for the processing history of the material was often inspired by real incidents.

Nuclear forensics is a key element of the response to nuclear security incidents and contributes to deter nuclear proliferation and nuclear terrorism through the wealth of information it may provide on the history of unknown material.

### Gender

### State

Other

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