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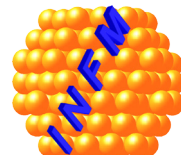
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# JEROME

Capabilities and interoperability for joint RO-BG cross-border first responder intervention to chemical-biological-radiological-nuclear-high yield explosive emergencies

Project Code : 15.3.1.051, e-MS ROBG - 121

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## BROCHURE



Interreg



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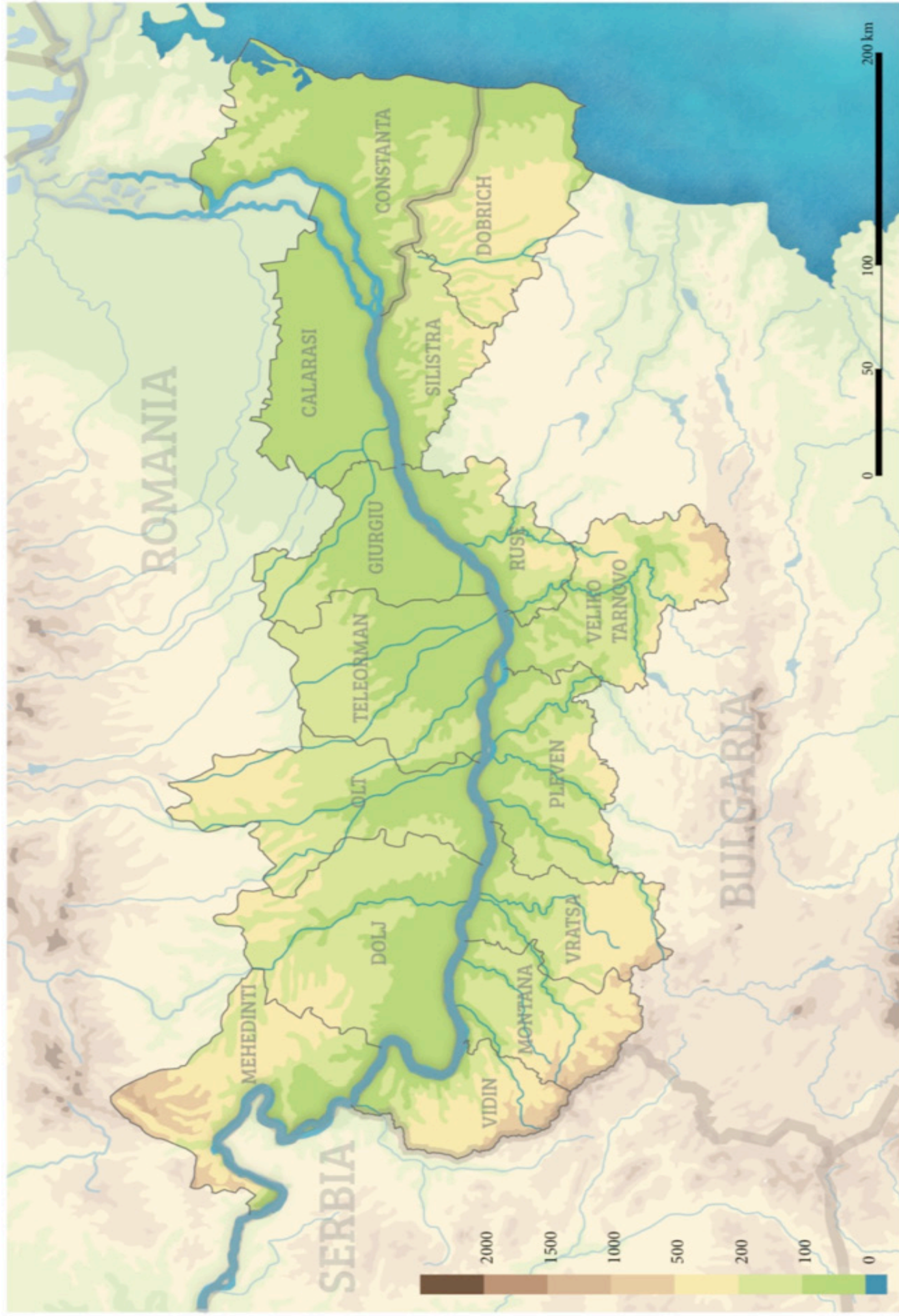


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Project “JEROME - Capabilities and interoperability for joint RO-BG cross-border first responder intervention to chemical-biological-radiological-nuclear-high yield explosive emergencies” is cofinanced by the European Union through European Regional Development Fund under the Interreg V-A Romania-Bulgaria Programme.

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# INTERREG V-A Romania-Bulgaria Programme

## JEROME

### Capabilities and interoperability for joint RO-BG cross-border first responder intervention to chemical-biological-radiological-nuclear-high yield explosive emergencies

Priority axis no. 3: A safe region

Specific objective 3.1: To improve joint risk management in the cross-border area

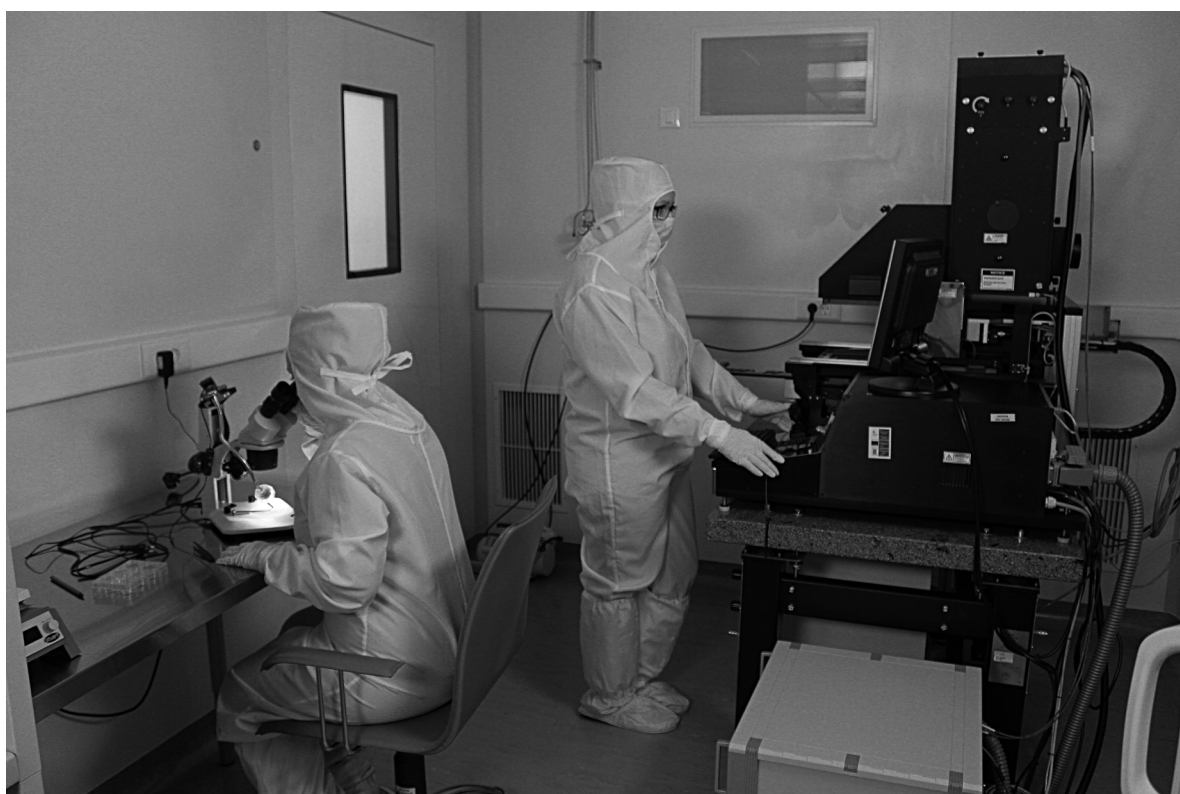
#### Project summary

The project addresses the need for enhancement of response and recovery capabilities of emergency services, derived from the recent national legislations. It aims at improving specific field activities conducted by specialized Police structures immediately after an event implying chemical-biological-radiological-nuclear-high yield explosives (CBRNe).

The project strategic objective is to set-up in Romania-Bulgaria cross-border area a fully interoperable, rapid reaction system to CBRNe emergencies, able to provide/accept services from both parts and to effectively use them to the benefit of the whole area population.

Identical mobile equipment will be provided to CBRNe police intervention units from both border sides, enabling them to collect data to characterize the situation in terms of event type, amplitude and responsibility, while gaining control of situation and securing the area. Rapid detection devices of CBR contaminants will be provided along with means for data transfer to emergency management authorities, enabling an adequate and effective response. Dedicated equipment for analyses of samples collected by operative units will be used by NIMP to produce the required assessments for evaluation and mitigation of longer term effects.

Thus, the project provides means of E.C. Decision 2008/617/JHA implementation for cross-border cooperation between special intervention units, realizing an integrated regional management of CBRNe emergencies.





## Common territorial challenges

Hazardous chemical, biological and radioactive materials (haz-mat) are present in the Romania-Bulgaria cross-border area from transport, technological processes or as wastes of industrial facilities and also from possible criminal actions resulting from the geo-political context.

Haz-mat emergencies are a major concern for authorities given their trans-national character and effects on the environment, population and economy. Determining at a very early stage the emergency nature is essential in planning a cost-effective intervention and recovery. Police forces are among the first to arrive at the scene of an emergency. Thus, from 2015 in both Romania and Bulgaria, special Units of the police forces are integrated in the national emergency systems, with specific duties as first-responders in case of CBRN events. The legal responsibilities of the police units extend from immediate life-saving actions and securing of the area, to gathering of information to characterize the type of emergency and collecting of samples. The project will provide these means and also initiate the establishment of RENFLAB, a regional environmental forensic laboratory to act as certifying analytical support body for the region. The EC Decision 2008/617/JHA provides the frame for Romania and Bulgaria to establish interoperable rapid CBRNe reaction units which can operate at regional scale, addressing the entire cross-border area as a single unit, moving without restriction across national borders.





## Main project objective

The ERDF grant allows for endowment of emergency response units from the cross-border area in a coordinated and integrated approach by providing along with the needed funding, also the platform for strong interconnection between organizations from different sides of the border, which set the stage for high-quality collaboration that, ensures achievement of project strategic objective in a relatively short period.

## Expected results

The project will provide the specialized CBRNe intervention units from the cross-border area with state-of-art equipment for detection of hazardous materials, along with means for rapid deployment and efficient containment.

The project places a strong focus on providing interoperability at all levels between CBRNe response units from both sides of the border, leading to a partnership providing protection of the entire cross-border area.

Fully integrated regional CBRNe response force, capable to deal with technological emergencies and threats, at level of EU standards and requirements, comprising of:

- **Mobile Units for specialized radiation and chemical search**

This is a highly specialized tool used by first-responders to high complexity CBRNe events, for rapid identification of presence and type of hazardous materials at the site. The configuration of the unit is derived from actual type and preponderancy of real CBRNe events encountered in the cross-border area and from CBRNe risk analysis regularly done by specialized governmental structures. The unit comprises of specific instrumentation that range from remote controlled intervention robot with radiologic and chemical sensors platform; X Ray scanning system; spectrometric systems for detection of toxic chemical materials; equipment for radiological and nuclear detection, to explosive devices handling systems, personnel protection and decontamination devices and communication.

- **Mobile Units for special CBRNe pyrotechnic intervention - 4 pcs**

The units are dedicated for small-scale CBRNe interventions within the cross-border area, and is equipped with essential devices needed for taking control in interventions when CBRN associated high-yield explosives are present. The unit integrates equipment for rapid detection and characterization of hazardous chemical-biological - nuclear material, as well as communication needed for reliable reporting and coordination of intervention.

- **Mobile Units for secure transport of chemical-biological-radioactive samples**

In case of CBRNe events, the special police intervention forces are the only structures within the national emergency response system, that have the authority and competency to procure, collect and transport CBRNe samples from the site, for establishment of event responsibilities. The mobile unit is designed to serve for transport to certified laboratories of samples collected by CBRNe special intervention teams from entire cross-border area. The mobile unit is equipped with means that ensure public safety conditions during the transport, avoidance of samples deterioration or cross-contamination, and also security of transported materials to external factors.

All these units will be equally distributed to Romanian and Bulgarian CBRNe teams.

## Certified laboratory

CBRN will maintain a (formalized) a partnership with the new created “RENFLAB” Partner Laboratory, from NIMP, which will involve critical scientific capabilities and expertise and provide the necessary confidentiality and security to support examinations involving hazardous materials.

Working with this Partner Laboratory, CBRNe will also participate in the research and development of new technologies to address capability gaps, and will collaborate with experts in defining best practices for the forensic analyses of CBRNe materials.

In the frame of JEROME project, RENFLAB will be equipped with Particle size analyzer used to determine the size of potential dangerous particle from solid, liquid or gaseous samples. The accurate particles’ size determination is an important parameter needed to predict the environmental spreading of a possible contaminant, its risks for inhalation/ingestion and also to evaluate its possible origin and to predict its chemical degradation rate, or to offer containment solutions.

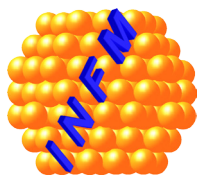
X-Ray Fluorescence Spectrometer. This provides a quick and accurate method to determine the elemental content and concentration of a sample. It is especially efficient because it does not depend of the chemical state of the atom, thus sensing potential toxic elements even if they are included in molecules or inside hard structures like metals or ceramics. Therefore it is possible to detect traces of potential contaminants even when embedded in environmental structures like building materials or soils.





## Project partners and beneficiary

### *Romanian partners*



### **NATIONAL RESEARCH-DEVELOPMENT INSTITUTE FOR MATERIALS PHYSICS - NIMP**

The National Institute of Materials Physics is the largest institute in Romania devoted to research and development in the field of solid state physics and materials. NIMP develops as a Center of excellence for research and high-level education (PhD, MSc, training courses) and provides a frame for interdisciplinary research in materials science. The research area covers Solid state physics (basic research) and Nanostructures and functional materials for energy applications, for information technology applications and for medicine and environmental protection applications. NIMP benefits from a brand new research infrastructure acquired in the last 5-7 years with state of the art equipment for materials synthesis and processing, structural, optical and physical properties characterization, with a strong emphasis on surface and interface science. The institute management develops a balanced policy of basic and application-oriented research.

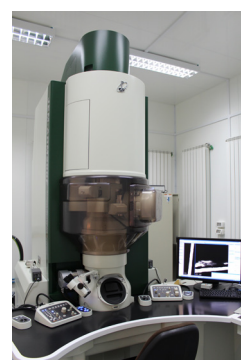
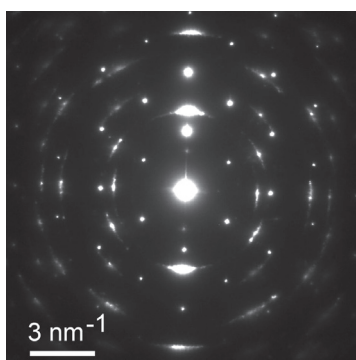
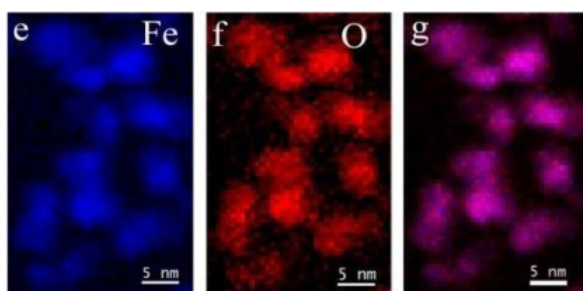


At only 65 km to Romania-Bulgaria border, NIMP is both the closest and largest research infrastructure for materials investigation. With highly qualified researchers and skilled specialized technicians, NIMP also benefits from a new research infrastructure acquired in the last years, having best in the region scientific equipment for structural, optical and physical properties characterization of materials and a certified laboratory for Chemical Analysis of Advanced Materials. NIMP is now developing the RITecC new center (~3500 m<sup>2</sup> of laboratory space) dedicated to applications, already including about 2 M€ equipment for analysis of environment relevant materials (like XPS, GC-MS, HRTEM+electron tomography) which matches many of the present project needs.



## Structural, morphological and compositional analyses in NIMP

High resolution (down to atomically scale) transmission electron microscope (TEM)

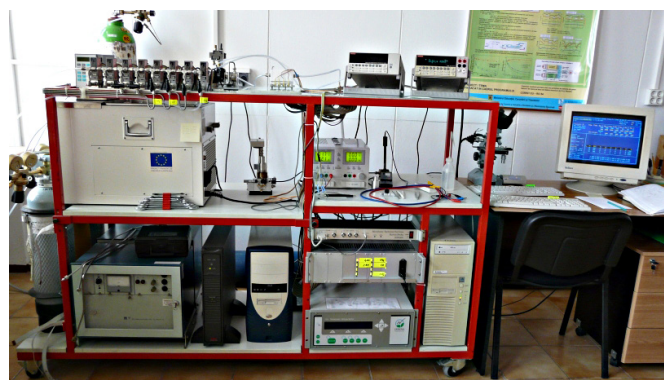


*Morphology, crystalline structure and elemental maps of specimens*

Electron Spin Resonance  
Impurities analyses



Controlled simulations of toxically and explosive  
gases using a Mixing Gases Station



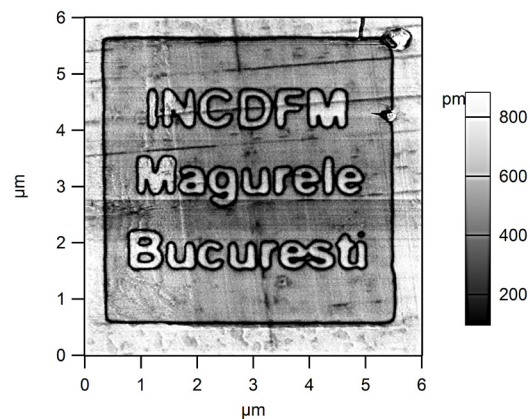
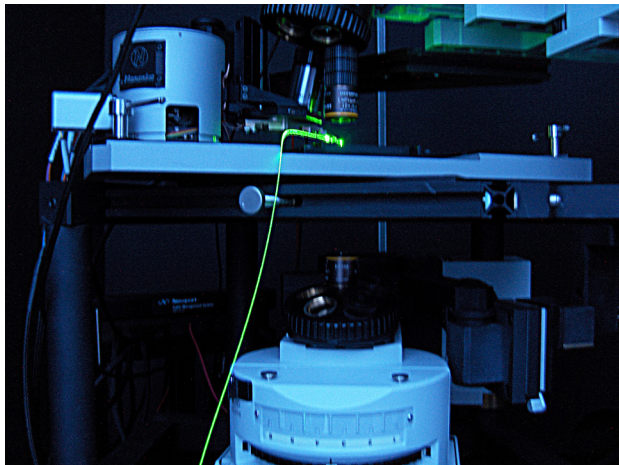
X-Ray Photoelectron Spectroscopy

Surface analyses able to identify atomic species and chemical bonding



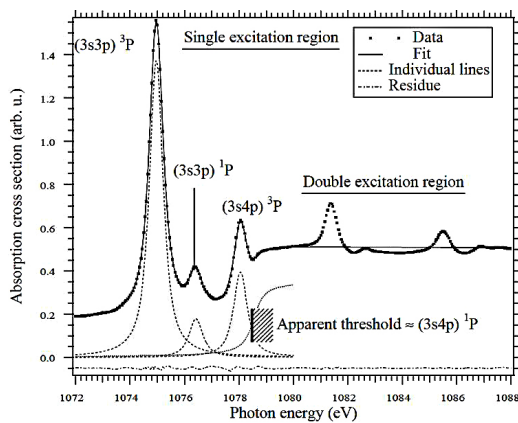


## 3D Surface analyses by atomic force microscopy (AFM)



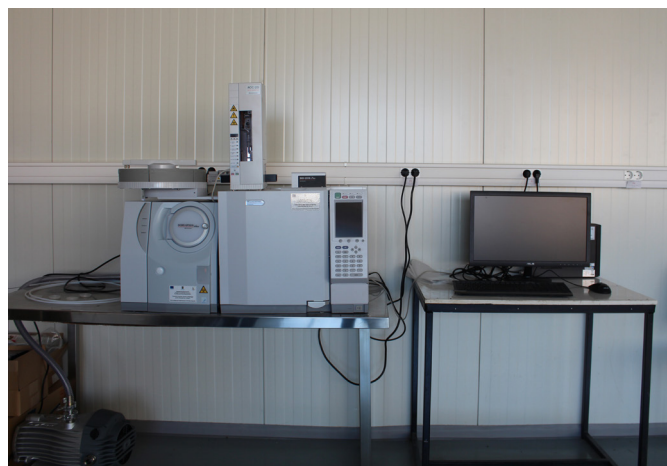
Surface topography

## X-Ray absorption spectroscopy (EXAFS)

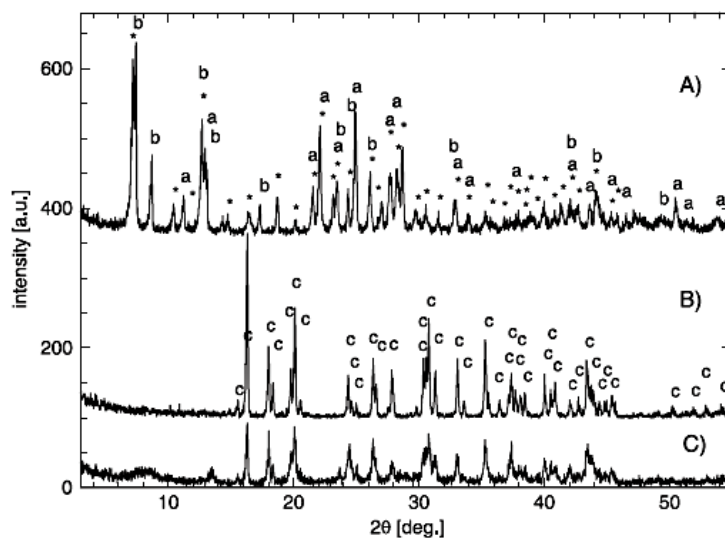


Local structure with atomic selectivity

## Gas chromatography and mass spectrometry



## X Ray diffraction on powders, thin films and bulk materials

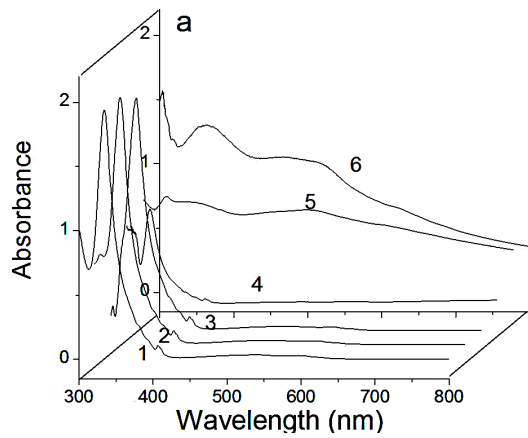


Crystalline structure of samples

# Optical characterization of materials

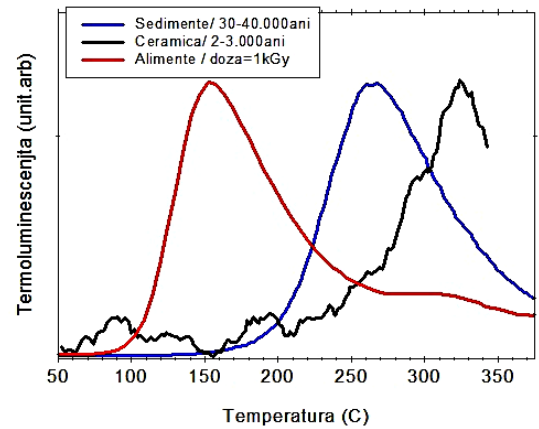
## Getting materials fingerprints

### UV-Vis-NIR Absorption spectroscopy on solid and liquid materials



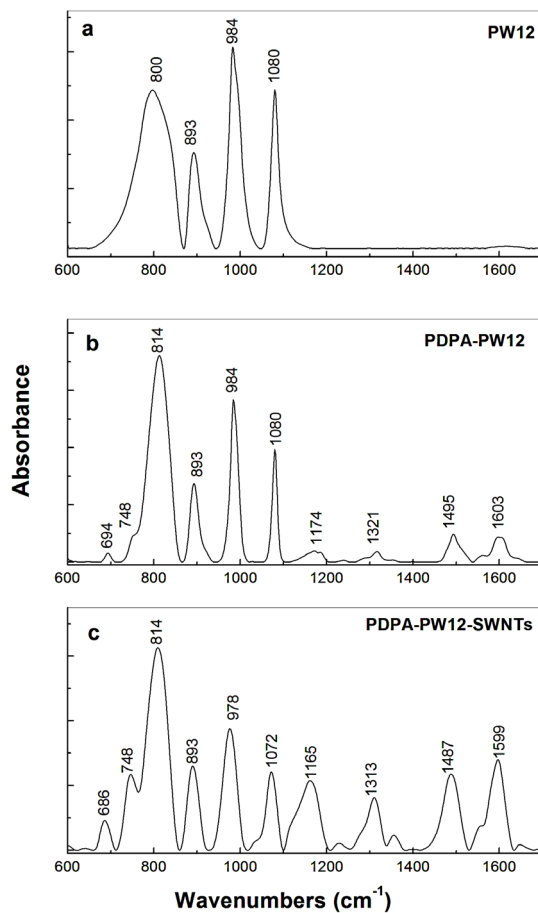
Chemical and structural analyses

### Thermoluminescence analyses



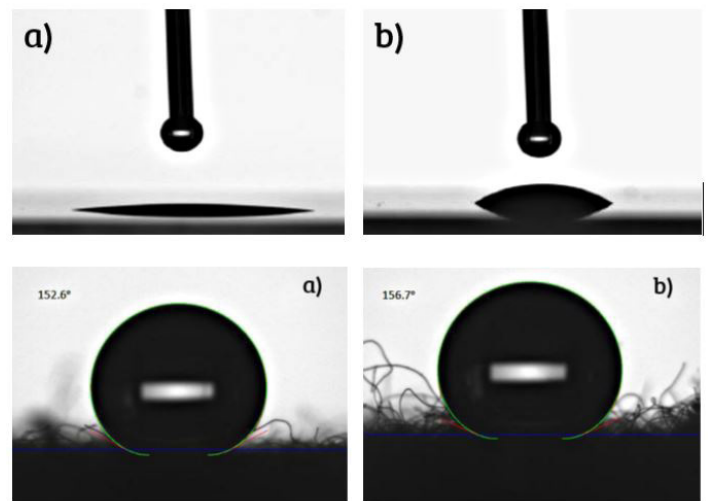
Materials history: age, irradiation history, retrospective dosimetry

### Infrared absorption spectroscopy



Specimen/sample fingerprint

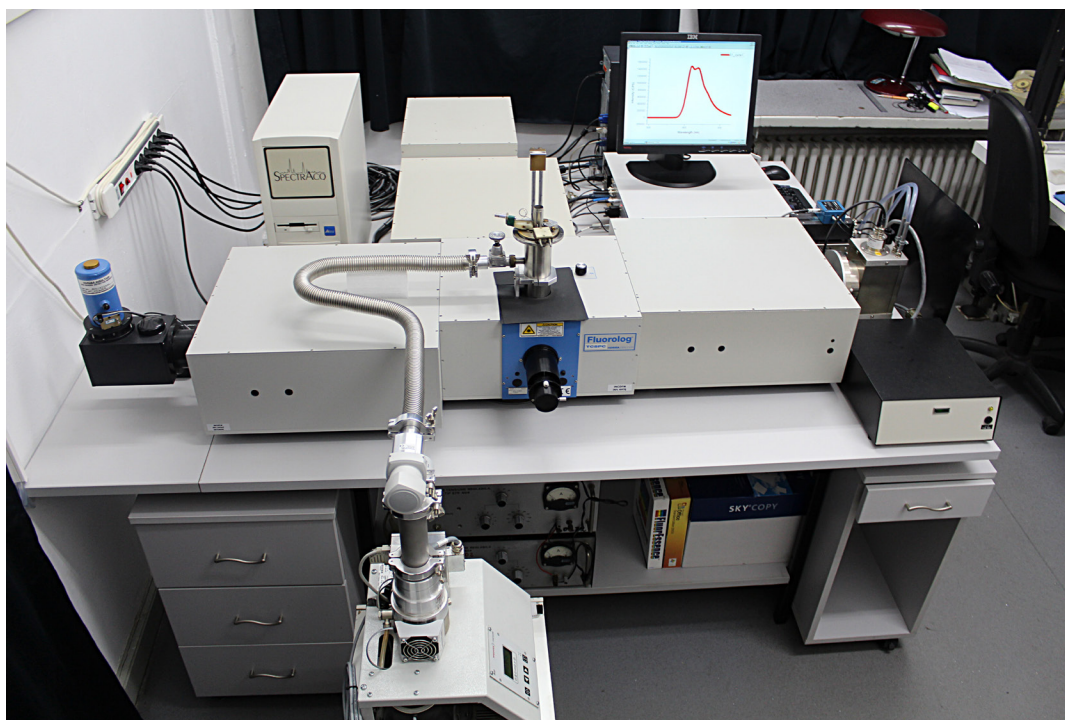
### Contact angle measurements



Surface tension, wettability



## Photoluminescence spectroscopy



Electronic structure of materials

## Raman spectroscopy



Chemical composition and molecular structure

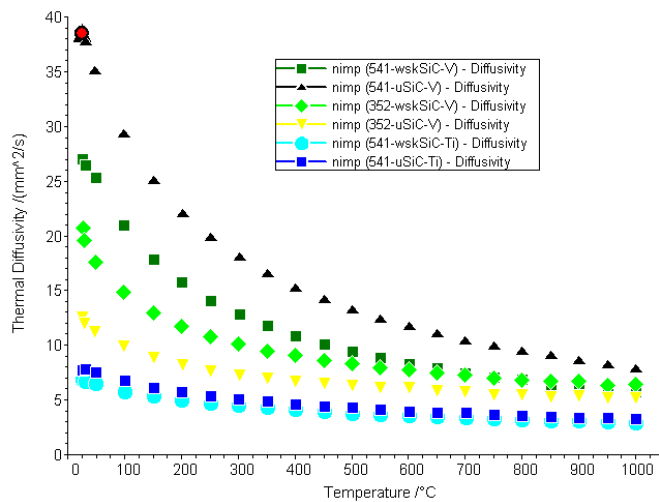
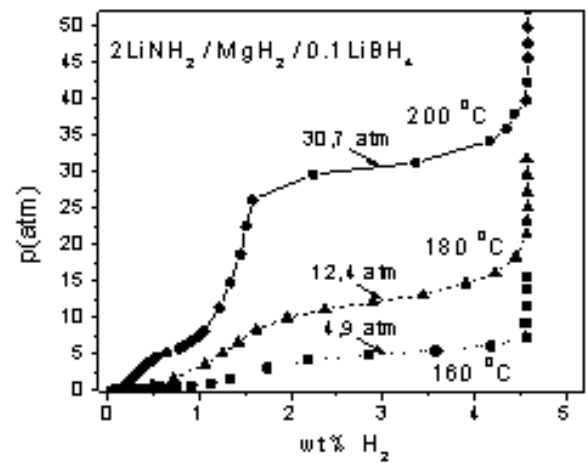
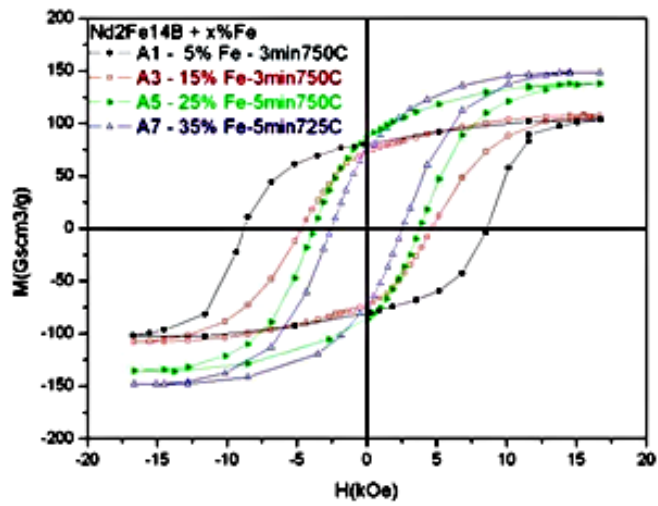


## Thermophysical analyses

Materials behaviour in a wide range of environmental parameters: temperature (from -270 °C up to 1600 °C), pressure (from 10<sup>-3</sup> Pa up to 1 GPa), magnetic fields (up to 14 T). NIMP is also the unique research institute in Romania having Mössbauer spectroscopy facilities.









## An overview of the Independent Service for Special Interventions and Actions (SIAS)

The Independent Service for Special Interventions and Actions is the central unit of the Romanian Police, which manages the activity known under the concept of special actions and interventions, a complex activity by the nature of the threats to which it is exposed.

The establishment of the SIAS within the General Police Inspectorate represented the capacity for institutional adaptation to the security needs of the society. Establishing professional standards defined by the rule of law and implicitly respecting human rights have created the premises for compatibility with elite units of EU Member States police.



The European Vocation of the Service for Special Interventions and Actions was established in April 2007 when the unit became an equal rights member of the Atlas Group, a group which emerged as a reaction of the European Union structures to the wave of terrorist attacks launched on 11 September 2001 and to the exacerbation of violent crimes committed in the European space. This group brings together 41 European Union Member State police forces.

Since 2008, SIAS has been a member of the European Explosives Ordnance Disposal Network, a European group that brings together the pyrotechnic intervention units of the EU Member States, as well as other invited states.

The Special Intervention and Action Service is responsible for interventions in hostage rescuing operations, the capture of particularly dangerous criminals, the close protection of people, pyrotechnic and CBRNe interventions.

On the line of interventions and special actions, the unit has accessed European funds within ISEC2011, and implemented 2 projects.

The SARES - Special Action Response in Emergency Situations project, run from 2013 to 2016, was developed in partnership with the Bulgarian Special Unit (SUCT). Within the project, six joint

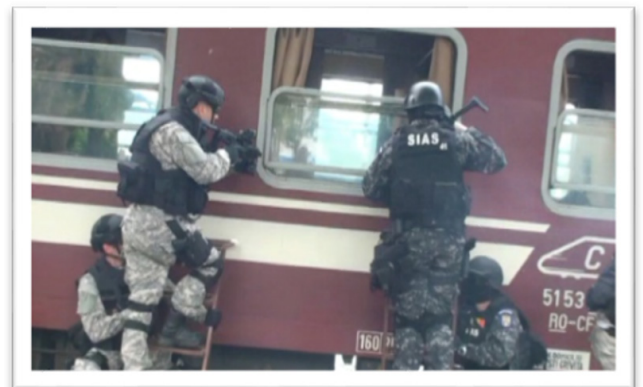
exercises were conducted with the Bulgarian partners, an experimental shooting session and several work groups focused on the assault theme. The budget of the project was 309,131.73 euros.



The SCAP project - Strengthening the capacity of action in cases of improvised explosive devices threats was another project run by SIAS between 2013 and 2016. The project was developed in partnership with the special unit in Bulgaria - SUCT.

Within the project, 5 training activities, 6 studio visits, experience exchange and a test of special loads for the neutralization of explosive devices were carried out.

More than 100 police officers from the Romanian Police Force Police took part in the training activities, as well as over 35 police officers from the Bulgarian pyrotechnic intervention teams. The funding from the European Commission for the project was 339,548.88 €. Training activities were coordinated by experts from the European Union.



Increasing the intervention capacity of the Romanian Police in the fight against terrorism is the current concern of the Service for Special Interventions and Actions and is accomplished by running a project with European funds from the Internal Security Fund, with a 2016 - 2019 implementation period. The budget of the project is worth of 17,923,194 lei. The purpose of the project is to equip the intervention structures of the Romanian Police with specific techniques and materials, as well as training sessions for minimum of 523 police officers within the intervention units.





The development of the two projects in partnership with the special unit in Bulgaria has led to the uniformization and harmonization of the tactics and intervention techniques. The two projects are to be unified by the JEROME project, a project that strives to fulfill the desideratum of JAI 617/2008 Decision which is to provide mutual support between the special intervention units of the member states of the European Union.





### **Specialized Unit for Combating Terrorism (SUCT) MINISTRY OF THE INTERIOR, BULGARIA**

The Specialized Unit for Combating Terrorism was established in 1979, as a result of the increasing terrorist activity in Europe during the 70's and its reflection in the Republic of Bulgaria under the name "Independent operative motorized battalion" (SOMB) within the Structure of the Ministry of Interior. The initial structure of the Unit is formed on a military basis. In 1992 the Unit was re-organized and it was given the current name - Specialized Unit for Combating Terrorism (SUCT) and in 2013 with changes in Mol law, The Bomb Squad has become a part of SUCT.

The Specialized Unit for Combating Terrorism (SUCT) is a specialized section under the direct command of the General Secretary of the Ministry of Interior for counter-terrorism activity, strategic and high importance objects defense and heavy crimes neutralization.



In accordance to its activities, the SUCT operators, prevent and neutralize terrorist activity, release hostages, detect, identify and neutralize improvised explosive devices and develop technical means to carry out these activities. They carry out physical-chemical investigation and expert evaluation of explosives, unknown substances, explosive devices and their components, as well as organize and perform protection of the Ministry of Interior authorities, state authorities and organizations during their functional activities and perform special operations along with the regional police departments.

During the release of hostages, taking into custody of persons performing especially dangerous crimes, when they resist armed opposition and according to the specifics of the tactical situation, during explosives and IED's render safe procedures, the SUCT operators have the following legal right to use firearms, explosives, pyrotechnical, chemical and technical devices that are part of the Unit's weaponry. The operators are equipped with special protective gear and equipment



which guaranties their personal safety and protects their identity when there is a need to split areas, stop or deviate civilian vehicle movement and temporary cut off power, gas lines and telecommunications.



Since 2007 the Specialized Unit for Combating Terrorism is a member of the European Counter - Terrorism Organization for Police Special Intervention Units “ATLAS”.

Since 2008 the Bulgarian Bomb Squad is a member of the European EOD Network - The official European CBRNe organization.

European projects of the SUCT:

- HOME/2011/ISEC - Strengthening the capacity of action in cases of IED threats - partner of GIRP (SIAS) - 381,130 euro
- HOME/2011/ISEC - Special action response in emergency situations - partner of GIRP (SIAS) - 275,432 euro
- FUND “INTERNAL SECURITY” - Modernization of training base and enhanced protection against bomb terrorism - 3,000,000 euro
- INTERREG V-A Romania-Bulgaria - JEROME - Capabilities and interoperability for joint RO-BG cross-border first responder intervention to chemical -biological-radiological-nuclear-high yield explosive emergencies - partner of NIMP and GIRP (SIAS)- 6,000,000 euro.



The Bomb Squad is composed by specialized intervention teams for immediate response to CBRNe incidents on the territory of Bulgaria. When hazardous materials and explosives are located, it provides searches and extracts evidence in cooperation with other operational services from within the Ministry of Interior. The Squad detects, identifies and neutralizes improvised explosive devices and develops technical means to carry out activities such as physico -chemical investigation, evaluation of explosive devices and unknown hazardous substances, executes technical investigation and supports other units within Mol in cases of major industrial accidents, elaborates intervention plans and establishes the technical capabilities for the CBRNe troops.





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