

## COMBINED ANALYSIS EXTENDED TO RAMAN AND IR SPECTROSCOPIES: SOLSA EU PROJECT

DANIEL CHATEIGNER (1), LUCA LUTTEROTTI (2), HENRY PILLIÈRE (3), SAULIUS GRAZULIS (4), YASSINE EL MENDILI (1), SÉBASTIEN PETIT (1), STEPHANIE GASCOIN (1), THOMAS LEFEVRE (3), DOMINIQUE HARANG (3); BEATE ORBERGER (5/\*), THANH BUI (5) CEDRIC DUÉE (6), NICOLAS MAUBEC (6), XAVIER BOURRAT (6), MONIQUE LE GUEN (5), ANNE SALAÜN (5), CELINE RODRIGUEZ (5), GINO MARIOTTO (7), MARCO GIAROLA (7), ARUN KUMAR (7), NICOLA DALDOSSO (7), MARCO ZANATTA (7), ADOLFO SPEGHINI (8), ANDREA SANSON (9), EVGENY BOROVIN (2), MAURO BORTOLOTTI (2), MARIA SECCHI (2), MAURIZIO MONTAGNA (10), FONS EIJKELKAMP (11), HARM NOLTE (11), PETER KOERT (11), FABIEN TROTET (12), MOHAMED KADAR (12), KAREN DEVAUX (12)

(1): Normandie Université, CRISMAT-ENSICAEN, UMR CNRS 6508, Université de Caen Normandie, 14050 Caen, France; (2) University of Trento, Industrial Engineering Department, 38123 Trento, Italy; (3) ThermoFisher, 71 rue d'Orléans, 45410 Artenay, France; (4) Vilnius University Institute of Biotechnology, 10223 Vilnius, Lietuva (Lithuania); (5) ERAMET, 1 Avenue Albert Einstein, 78190 Trappes, France; \*Université Paris Sud, GEOPS, Bât 504, 91405 Orsay, France; (6) BRGM, 3 avenue Claude Guillemin, BP 36009, 45060 Orléans Cédex 2, France; (7) University of Verona, Department of Computer Science, 37134 Verona, Italy; (8) University of Verona, Department of Biotechnology; (9) University of Padua, Department of Physics; (10) University of Trento, Physics Department, 38123 Trento, Italy; (11) Royal Eijkelpark, Giesbeek, The Netherlands; (12) ERAMET-SLN, Nouméa, New Caledonia

The SOLSA project aims to construct an analytical expert system for on-line-on-mine-real-time mineralogical and geochemical analyses on sonic drilled cores, an unprecedented challenge both in terms of instrumental, methodological and software developments.

Two instrumental developments will be carried out during this European project, one at the laboratory scale (ID1) deserving methodological testing, the other at the operational on-mine scale (ID2). At present, only ID1 is achieved for first tests. This instrument will perform simultaneously x-ray diffraction experiments, coupled to x-ray fluorescence, Raman and IR spectroscopies. It consists in a 4-circles diffractometer equipped with a curved position sensitive detector and a Cu microsource, a fluorescence detector, and an innovative system of fiber optics and mirrors to achieve Raman and IR probing. All the four experiments are able to probe a flat surface sample within approximately the same sampled volume.

In order to benefit of the complementarity of the four techniques, an expert system able to refine all datasets has to be developed. For the x-ray diffraction and fluorescence parts, the actual Combined Analysis methodology is operational for structure, microstructure, texture, stress, phases and element analyses. Complementing the Combined Analysis approach by Raman and IR spectroscopies is targeted in this project to help phase identifications and quantifications. In this aim the expert system will use Open Databases, either already existing like the Crystallography Open Database, or to be developed like the Raman Open Database.

We will illustrate the actual state-of-the-art Combined Analysis, and envision its near-future developments within the spectroscopies context.