

International Research laboratory ELYTMaX

Engineering Science Lyon Tohoku, Materials and systems under extreme conditions



CNRS, Univ. Lyon, INSA Lyon, Centrale Lyon, University Claude Bernard Lyon 1, Tohoku University.

Laboratory presentation by Gael Sebald, co-director of ELYTMaX

This presentation aims at showing the research activities held at ELYTMaX, and the collaboration possibilities with permanent researchers of Tohoku University in Japan.

ELYTMaX was launched as an International Joint Unit (UMI), and is now an International Research Lab (IRL) under the triple framework of CNRS, Université de Lyon (France) and Tohoku University (Japan). The Japan site of ELYTMaX is located at Tohoku University in Sendai, and regroups around 20 people (both from France and Japan) including Full Professors, Associate and Assistant Professors, postdoctoral fellows, double degree PhD, Master students and administrative staff.

ELYTMaX laboratory is conducting researches in engineering science research field, combining expertise from mechanical engineering, electrical engineering, material science and electrochemistry. As an international joint unit, joint expertise of Japanese and French researchers is gathered to investigate together material behavior, and to propose innovative solutions to monitor their lifetime.

The research conducted at ELYTMaX laboratory covers upstream and generic aspects as well as more applied aspects, and focuses on the behavior of materials (and the systems they form) under extreme and complex conditions (pressure, temperature, electromagnetic field, radiation, or highly corrosive environments).

In the view of predicting and extending lifetime of materials and structures, three main strategies are developed:

- Fabrication / Repair of the materials and systems, for minimizing or recovering from their degradation,
- Investigation of the behavior of materials, when subjected to complex solicitations or environments, including both structural materials and smart materials,
- Monitoring of the structural health of materials and systems, through Non Destructive Techniques.

These three main strategies are supported by multi-physics and multi-scale modeling, for better understanding physical-chemical insights of materials and systems behavior.

The typical application field is the energy industry (e.g. electrical power plants), transportation and medical devices. The strategy is refined notably through scientific questionings coming from the applications, where the type of degradation of materials which are studied comes from practical cases.

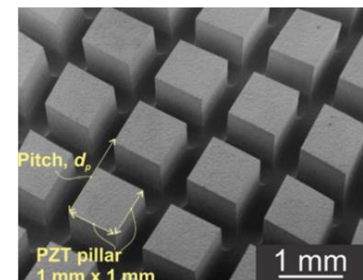
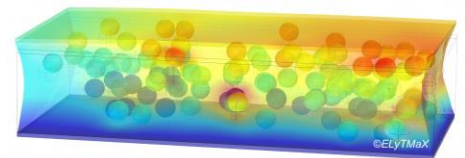
Date and Time:

July 6th (WED) 2022, time: 10:00

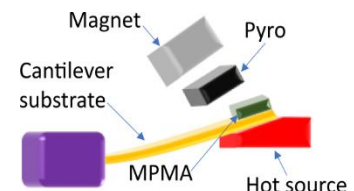
Place:

Amphithéâtre du C2N

Deformation of heterogeneous medium under electromagnetic field



Nguyen, *Sensors and Materials*, **32**, 2517 (2020)



Lallart *et al.*, *Applied Energy*, **288**, 116617 (2021)