CNRS-JSPS France-Japan Seminar
28 – 30 October 2014, Pornichet, France

New EPM developments for energy, materials and environment

Introductory

The seminar France-Japan deals with an on a highly scalable discipline relative to the use of magnetic fields to act without materials contact, i.e. Electromagnetic Processes of Materials (acronym EPM).

This seminar began in 1996. Since then, the seminar takes place alternately in France and Japan, and six editions were organized jointly:

- in France by the EPM / SIMAP group (formerly Laboratory Electromagnetic Processing Magnetic) and LSG2M (since incorporated into the Institut Jean Lamour).
- In Japan by the Department of Science and Materials Engineering of Nagoya University and the Department of Materials and Environment, University of Sendai.

The first six seminars were coordinated respectively by Marcel GARNIER, Shigeo ASAI, Pascale GILLON, Kazuhiko IWAI, Alain JARDY and Shoji TANIGUCHI.

Given the success of the fifth and sixth editions, which were held in May 2007 in Nancy and in May 2010 in Hakone (Japan), we decided to continue the principle of French co-organization and to join by 2007 two french poles of EPM: the Ecole des Mines de Paris, Sophia-Antipolis (CEMEF) represented by Francois Bay and the Research Institute of Electric Power in Nantes Atlantique (IREENA) represented by Gerard Berthiau. And organizing the 7th edition was entrusted to the latter laboratory.

• for the French part, Prof Gerard Berthiau (IREENA), Dr. Jacqueline etay (EPM / SIMAP)

• for the Japanese part, Prof. Hideyuki Yasuda (Kyoto University)

Location

Located on a seaside of the Atlantic Ocean, Pornichet is a resort which developed as a tourism spot in the mid of the nineteenth century. It owns three beaches, a lot of original villas, salt marshes and marinas.

Program

Thuesday October 28, 2014

11:00 - 12:00	**Welcome**
12:00 – 13:30	**Lunch**

13:30 – 13:45	**Opening session** Gerard BERTHIAU, Hideyuki YASUDA
13:45 – 14:30	Opening lecture : Egbert BAAKE, Sergejs SPITAN
	Analysis and design of EPM applications using numerical modeling

14:30 – 16:30	**Session : Numerical modeling and fields calculations**
14:30 – 15:00	François BAY, Jose ALVES ZAPATA
	Computational modeling of electromagnetic couplings in manufacturing processes - Applications to magnetic pulse forming processes
15 :00 – 15 :30	Mathilde HUGO, Bernard DUSSOUBS, Alain JARDY
	A numerical study of the electric current in the crucible of an electroslag unit
15:30 – 16:00	Raphael SCAPOLAN, Annie GAGNOUD, Yves du TERRAIL
	3D electromagnetic modelling of multistrands inductors
16 :00 – 16 :30	Huu Kien BUI, Gérard BERTHIAU, Guillaume WASSELYNCK, Didier TRICHET, Javad FOULADGAR, Mouloud FELIACHI
	Multiphysics and multiscale modeling for induction thermography testing of Carbon Fiber Reinforced Polymer material
16:30 – 17:00	Coffee break
17:00 - 18:00	**Session : Electromagnetic techniques for non-destructive testing and physical properties measurements of materials**
17 :00 – 17 :30	Jacqueline ETAY, Annie GAGNOUD, Alimata DIARRA, Christian GARNIER, Stéphane MASSUCCI, Mazen ALAMI, André SULPICE, Sophie RIVOIRARD
	A new device for measuring thermal conductivity and heat capacity of metallic alloys by electromagnetic levitation
17:30 – 18:00	Samuel SIEDEL
	Bubble electrohydrodynamic deformation in a perfect dielectric fluid
18:00 – 18:30	Sadahiro TSUREKAWA, Kyosuke HIRAYAMA, Seiichiro II
	Grain boundary magnetism in ferromagnetic metals

Wednesday October 29, 2014

09:00 – 10:00	**Session : Plasma treatment**
09:00 – 09:30	Guy CHICHIGNOUD, Jochen ALTENBEREND, Yves DELANNOY
	E–H mode transition of an inductively coupled plasma torch at atmospheric pressure
09 :30 – 10:00	Takehito TOH, Takahiro YAMADA, Toshiya HARADA
	MHD analysis of plasma arc applied to steelmaking process

10:00 – 10:30	**Coffee break**

10:30 - 12:30	**Session : Intense magnetic fields: segregation control in metals by external magnetic fields, solidification/crystallization in magnetic fields, thermoelectric effects**
10:30 – 11 :00	A. HASHIMOTO, N. NAKATSUKA, K. KUROKAWA, H. YASUDA, T. NAGIRA, M. YOSHIYA, K. MORISHITA
	Magnetically-aligned dense β-(Fe, Mn)Si_2 crystals
11:00 – 11:30	Noriyuki HIROTA, Hitoshi WADA, Motosuke KIYOHARA, Masaru TANOKURA, Hidehiko OKADA, Takahiro ODE, Akira NAKAMURA, Jun OHTSUKA
	Development of the high quality protein crystal growth device under controlled gravity environment using high magnetic force
11:30 – 12:00	Ryosuke KUSUMI, Fumiko KIMURA, Tsunehisa KIMURA
	Single crystal solid-state NMR of magnetically oriented microcrystal array
12:00 – 12:30	François DEBRAY, Eric BEAUGNON
	Magnet development at the Laboratoire National des Champs Magnétiques Intenses

12:30 – 19:30	**Lunchbox-Bento – Technical Visit - Excursion**

19:30 – 23:30	**Gala dinner**

Hermitage Barrière
La Baule

Thurday October 30, 2014

09:00 – 12:30	**Session : Material manufacturing processes by magnetic fields – environmental applications : recycling, separation of heavy metals**
09 :00 – 09 :30	Noboru YOSHIKAWA
	Microwave Energy Application to Materials' Processing and Green Technology
09:30 – 10:00	Akshay BANSAL, Pierre CHAPELLE, Yves DELANNOY, Jean-Pierre BELLOT
	Free surface shape of an aluminum bath in an induction furnace: experiment and simulation
10:00 – 10:30	**Coffee break**
10:30 – 11:00	Kazuhiko IWAI, Asuka MARUYAMA Hokkaido University
	Application of electromagnetic vibration to alloy modification
11:00 – 11:30	Yannick CHAMPION, Loïc PERRIERE
	Design and processing using RF induction of metallic glasses: Preperation of Mg-mischmetal alloys
11 :30 – 12 :00	Tomoya NAGIRA, Noriaki NAKATSUKA, Hideyuki YASUDA, Kentaro UESUGI
	Radiographic observation of microstructural evolution in Sn-Bi alloy induced by ultrasonic vibration
12 :00 – 12 :30	Hideyuki YASUDA, Jacqueline ETAY, Gérard BERTHIAU
	Concluding words