

**French-Russian Workshop on SHS and Reactive Nano-Systems**  
**Room 303, Building D, Science Faculty Mirande, Dijon**

**Program**

**Monday, October 4 2010**

9:00 Welcome and Introduction

Self-propagating High Temperature Synthesis (SHS): theory, experiment, applications

(Chair: J.C. Niepce)

9:30 A. Lemarchand (Université Pierre et Marie Curie, France)

*Propagation of an exothermic chemical wave front: from perfect gas to van der Waals fluids.*

10:00 A.S. Rogachev and F. Baras (ISMAN, Russia – ICB, France)

*Combustion modes and shape of the SHS front in the vicinity of combustibility limits.*

10:30 A.E. Sytshev, S.G. Vadchenko, D. Vrel, N.V. Sachkova, and D.Yu. Kovalev SHS (ISMAN, Russia)

*Joining of intermetallics with metal substrates.*

11:00 Coffee break

11:30 A.S. Rogachev, S.G. Vadchenko and N.V. Sachkova (ISMAN, Russia)

*On the mechanism of reaction wave in the Ni/Al multilayer nanofoils.*

12:00 C. Antoine (Université Pierre et Marie Curie, France)

*Nonlinear hydrodynamic corrections to FKPP exothermic wave fronts.*

Solid-gas reactions and filtration combustion (Chair: A. Lemarchand)

14:30 V.V. Grachev and A.V. Linde (ISMAN, Russia)

*Surface and layer-by-layer modes of filtration combustion: theory and experiment*

15:00 R.-M. Ayral and F. Rouessac (Université Montpellier II, France)

*Study of the combustion between sulfur and zinc in different gaseous atmospheres (Argon, Nitrogen).*

Exothermic heterogeneous reactions of nano-sized reactants, combustion in nano-systems

(Chair: A.S. Rogachev)

15:30 P.A. Tsygankov (MTSU Moscow, Russia)

*Production and investigation of the reactive multilayer nano-foils.*

16:00 O. Politano, D. Linde and F. Baras (ICB, Université de Bourgogne, France)

*Nanometric metallic multilayers: a molecular dynamics approach.*

16:30 Tea time

Time-resolved methods in SHS and SPS (X-rays and Synchrotrone rays diffraction, etc.)

(Chair: F. Bernard)

17:00 A.S. Rogachev, D.Yu. Kovalev, B.P. Tolochko and M.R. Sharafutdinov (Russia)

*TRXRD study of nano-heterogeneous reactions in multilayer films.*

17:30 B.P. Tolochko and M.R. Sharafutdinov (ISSCMC SB RAS, Novosibirsk, Russia)

*Synchrotron radiation as a tool to study dynamics of fast and ultra-fast physical-chemical processes.*

20:00 Dinner at the Clos des Capucines

## Tuesday, October 5 2010

### Spark Plasma Sintering process (SPS) and its relations to SHS (Chair: A.E.Sytschev)

- 9:30 J. Decooninck, N. Pradeilles and A. Maître (SPCTS, Université de Limoges, France)  
*Study of SHS and SPS coupling for the elaboration of non-oxide ceramics composites.*
- 10:00 F. Bernard (ICB, Université de Bourgogne, France)  
*Production of dense intermetallics by a mechanically activated reactive sintering.*

### Mechanisms of crystal structure and microstructure formation in SHS, SPS and related processes (Chair: J.-C. Gachon)

- 10:30 D. Vrel (LIMHP, Université Paris 13, France)  
*Synthesis of high purity Ti-Al-C MAX compounds by SHS from the elements and through aluminothermic reactions.*

11:00 Coffee break

- 11:30 D.Yu. Kovalev (Russia)  
*Effect of mechanical activation on the dynamic of phase formation in SHS (autowave and thermal explosion regimes).*
- 12:00 O.K. Kamynina, A.E. Sytschev, S.G. Vadchenko, O.D. Boyarchenko and L.M. Umarov (ISMAN, Russia)  
*Influence of the B<sub>4</sub>C-additive on the SHS of intermetallics*

### Mechanical activation of SHS systems (Chair: A. Maître)

- 14:30 E.I. Patsera, N.A. Kochetov, V.V.Kurbatkina, E.A.Levashov (MISiS, ISMAN, Russia)  
*The combustion features of the mechanically activated Ti-Cr-B mixtures.*
- 15:00 D. Vrel (LIMHP, Université Paris 13, France)  
*Synthesis of dense NiAl compounds by extrusion activated solid state reaction and by extrusion activated confined SHS reactions.*
- 15:30 V.V. Kurbatkina, S.I.Rupasov, Yu.S. Pogozev, E.A.Levashov, E.I.Patsera (MISiS, Russia)  
*MAX phases on the base of Ti<sub>(2-x)</sub>Cr<sub>x</sub>AlC prepared by MA SHS.*
- 16:00 Round table and tea: from recent results to future research projects between Russian and French laboratories on SHS and related topics.

We propose 20 min for each talk and 10 min for discussions.

The role of the chairman(women) is essential in the framework of our seminar. He or she has to initiate discussions after each talk to be able to define new research issues

## Wednesday, October 6 2010

9:30 – 15:00

Work in the groups: discussing on the plans and joint proposals.