



E-MRS – IUMRS – ICEM 2000



SYMPOSIUM B

Initiative for Inert Matrix Fuel - 6th IMF workshop

The “Initiative for Inert Matrix Fuel” deals with the problem of plutonium and minor actinide excesses, and with their recycling in reactors. The working group has been acting since 1995 and is organising the 6th IMF workshop in the frame of the EMRS 2000 spring meeting.

[www/psi.ch/lwv/emrs.htm](http://www.psi.ch/lwv/emrs.htm)

May 30 – June 2, 2000

Symposium Organizers:

C. DEGUELDRE, PSI, Villigen-PSI, Switzerland
C. LOMBARDI, PolyTechnic, Milano, Italy
H. MATZKE, ITU, Karlsruhe, Germany
J. PORTA, CEA, Cadarache, St P.Durance, France
J.M. PARATTE, PSI, Villigen-PSI, Switzerland
S. ION, BNFL, Cumbria, U.K.

Symposium Support:

UAK, Switzerland

Papers will be published in Prof Nuclear Energy

E-MRS 2000 SPRING MEETING

Symposium B

Tuesday, May 30, 2000
Mardi 30 mai 2000

Morning
Matin

1. Material science

Session 1.1. - Basic properties

Chairpersons: C. Degueldre (PSI) - Y.-W. Lee (KAERI)

Topics : IMF fabrication and characterisation: density, porosity, lattice parameters, C_p , K , hardness, compressibility, phase diagram... for solid solution with actinide or analogus. Comparison with UO_2 .

8:30 **WELCOME**

B-1.1.1 8:45 **Invited** COMPLEX BEHAVIOR IN UO_2 -MOX AND IMF: WHAT DO THESE MATERIALS LOOK LIKE AT THE NANOMETER SCALE?, **S.D. Conradson** and Ph. Vilella, Los Alamos National Laboratory, F.J. Espinoza, CINVESTAV Merida, C. Degueldre, Paul Scherrer Institute, Switzerland

B-1.1.2 9:45 FABRICATION OF ZIRCONIA BASED TARGETS FOR TRANSMUTATION, N. Boucharat, A. Fernández, J. Somers, R.J.M. Konings, D. Haas, European Commission, Joint Research Centre, Institute for Transuranium Elements, P.O. Box 2340, 76125 Karlsruhe, Germany

B-1.1.3 10:00 DESIGN AND FABRICATION OF A PLUTONIUM-INCINERATION EXPERIMENT USING INERT MATRICES IN A ONCE THROUGH THEN OUT MODE, R.P.C. Schram, K. Bakker, H. Hein, J.G. Boshoven, R.R. van der Laan, NRG Petten, The Netherlands; Toshiyuki Yamashita, JAERI, Japan; G. Ledergerber, F. Ingold, PSI, Switzerland; R. Conrad, JRC-IAM, The Netherlands

B-1.1.4 10:15 REEVALUATION OF PHASE RELATIONSHIP BETWEEN PuO_2 AND ZrO_2 , H. Serizawa, K. Nakajima, Y. Arai, T. Yamashita and K. Kuramoto, JAERI, Oarai, Higashi Ibaraki, Ibaraki, 311-1394 Japan and H. Kinoshita, S. Yamanaka, M. Uno, K. Kurosaki, Osaka Univ. Yamadaoka 2-1, Suita, Osaka 565-0871, Japan

10:30 **BREAK**

- B-1.1.5** 11:00 STUDY ON THE BASIC MECHANICAL PROPERTY AND BEHAVIOR AGAINST THERMAL SHOCK OF SIMULATED ZrO₂-BASED INERT MATRIX FUEL MATERIAL, Y.-W. Lee, H.S. Kim, S.H. Kim, C.Y. Joung, S.C. Lee, S.H. Na, Korea Atomic Energy Research Institute, P.O.Box 105, Yuseong, Taejon, Korea and P. Heimgartner, G. Ledergerber, Paul Scherrer Institut, 5232 Villigen PSI, Switzerland
- B-1.1.6** 11:15 X-RAY DIFFRACTION ANALYSIS AND DATA INTER-PRETATION OF STABILIZED ZIRCONIA INERT MATRIX FUEL DOPED WITH PLUTONIUM, M. Burghartz, G. Ledergerber, F. Ingold, P. Heimgartner, C. Degueldre; Paul Scherrer Institute, Laboratory for Materials Behaviour, 5232 Villigen PSI, Switzerland
- B-1.1.7** 11:30 ZIRCONIA-BASED MATERIALS FOR TRANSMUTATION OF AMERICIUM AND CURIUM : CUBIC STABILIZED ZIRCONIA AND PYROCHLORES, P.E. Raison⁽¹⁾ and R.G. Haire⁽²⁾, ⁽¹⁾Commissariat à l'Energie Atomique, CEA-Cadarache DRN/DEC/SPUA/LACA, 13108 St Paul lez Durance, France, ⁽²⁾Oak Ridge National Laboratory, P.O Box 2008, Oak Ridge TN 37831-6375, USA
- B-1.1.8** 11:45 ANALYSIS OF POROUS FEATURES OF ZIRCONIA BASED INERT MATRIX AND IMPACT ON THE MATERIAL QUALIFICATION, C. Degueldre, M.A. Pouchon, M. Streit, O. Zaharko. Paul Scherrer Institute, 5232 Villigen PSI, Switzerland
- B-1.1.9** 12:00 BORON CARBIDE AS A POTENTIAL INERT MATRIX: AN EVALUATION, D. Gosset, B. Provot, CEA Saclay, DMT/SEMI/LM2E, 91191 Gif/Yvette, France
- 12:15 **LUNCH**

Tuesday, May 30, 2000
Mardi 30 mai 2000

Afternoon
Après-midi

Session 1.2. - Behaviour under irradiation

Chairpersons: H. Matzke (ITU) - R. Ewing (UniMichigan)

Topics: Fundamental aspects of the IMF behaviour under irradiation : characterisation of the IMF under irradiation e.g. with accelerators and study of relevant properties (swelling, phase transformation, FP retention...).

- B-1.2.1** 14:00 **Invited** IRRADIATION EFFECTS IN INERT MATRIX FUELS, **W.J. Weber**, Pacific Northwest National Laboratory, Richland WA, USA
- B-1.2.2** 14:30 THERMAL STABILITY OF IMPLANTED FISSION PRODUCT ELEMENTS IN YTTRIA STABILIZED ZIRCONIA, M. Pouchon, M. Döbeli, C. Degueldre, Paul Scherrer Institut, 5232 Villigen PSI, Switzerland
- B-1.2.3** 14:45 HIGH-TEMPERATURE BEHAVIOUR OF FISSION PRODUCTS IN ADVANCED NUCLEAR FUEL MATERIALS, L. Thomé, CSNSM, 91405 Orsay, France, and F. Garrido, J. Jagielski, ITME, 01919 Warsaw, Poland
- B-1.2.4** 15:00 DAMAGE PRODUCED IN $MgAl_2O_4$ BY FISSION PRODUCTS OF FISSION ENERGY: MODIFICATIONS OF THE MICROSTRUCTURE, T. Wiss, Hj. Matzke, V.V. Rondinella, European Commission, Joint Research Centre, Institute for Transuranium Elements, Postfach 2340, 76125 Karlsruhe, Germany, T. Sonoda, CRIEPI, Japan, W. Assmann, TUM, Germany, M. Toulemonde, CEA-CNRS, France, and C. Trautmann, GSI, Germany
- B-1.2.5** 15:15 ANNEALING EFFECTS OF HELIUM IMPLANTED MONOCRYSTALLINE AND POLYCRYSTALLINE SPINEL $MgAl_2O_4$, E.A.C. Neef, R.P.C. Schram, NRG, P.O. Box 25, 1755 ZG Petten, The Netherlands, A.van Veen, F. Labohm, IRI, Delft University of Technology, Mekelweg 15, 2629 JB Delft, The Netherlands
- B-1.2.6** 15:30 RADIATION DAMAGE AND SIMULATED FISSION PRODUCTS EFFECTS ON THE PROPERTIES OF INERT MATRIX MATERIALS, V.V. Rondinella, T. Wiss, Hj. Matzke, R. Mele, M. Betti, European Commission, Joint Research Centre, Institute for Transuranium Elements, Postfach 2340, 76125 Karlsruhe, Germany and P.G. Lucuta, ACERAM Technologies Inc., Kingston, Canada
- B-1.2.7** 15:45 EFFECTS OF XENON ION IMPLANTATION IN SPINEL WITH YTTRIA STABILIZED CUBIC ZIRCONIA, Lumin Wang⁽¹⁾, Shixin Wang⁽¹⁾, Sha Zhu⁽¹⁾, R.C. Ewing⁽¹⁾, N. Boucharat⁽²⁾ and Hj. Matzke⁽²⁾, ⁽¹⁾Department of Nuclear Engineering and Radiological Sciences, University of Michigan, Ann Arbor MI 48109-2104, USA, ⁽²⁾Institute for Transuranium Elements, European Commission Joint Research Center, 76125 Karlsruhe, Germany
- B-1.2.8** 16:00 SWELLING AND DAMAGE CHARACTERISATION IN FLUORITE AND OTHER MATRICES IRRADIATED BY HEAVY IONS IN THE ELECTRONIC STOPPING POWER REGIME, M. Boccanfuso⁽¹⁾, A. Benyagoub⁽¹⁾, Ch. Dufour⁽²⁾, A. Dunlop⁽³⁾, J. Jensen⁽⁴⁾, K. Schwartz⁽⁵⁾, C. Trautmann⁽⁵⁾ and M. Toulemonde⁽¹⁾, ⁽¹⁾CIRIL, CEA/CNRS/University, BP 5133, 14070 Caen-Cedex 5, France, ⁽²⁾LERMAT/ISMRA, 14050 Caen-Cedex, France, ⁽³⁾LSI CEA/Ecole Polytechnique, 91128 Palaiseau Cedex, France, ⁽⁴⁾Fysisk institut Universitet campusvej 55, 5230 Odense Denmark, ⁽⁵⁾GSI, Materialforschung, Planckstr. 1, 64291 Darmstadt, Germany
- B-1.2.9** 16:15 IRRADIATION FACILITIES AT GANIL: A TOOL FOR INERT MATRIX STUDIES UNDER HEAVY ION IMPACTS, M. Van Den Bossche⁽¹⁾ and M. Toulemonde⁽²⁾, ⁽¹⁾GARI/GANIL, BP 5027, 14076 Caen Cedex 5, France, ⁽²⁾GARI/CIRIL, BP 5133, 14070 Caen Cedex 5, France
- 16:30 **BREAK**

Session 1.3 - IMF Dispositions

Chairpersons: Ch. Brown (BNFL) - G. Lumpkin (ANSTO)

Topics : IMF utilisation in reactors and strategies followed: once-through-then-out for geological disposal, or multi-reprocessing. The session concerns calculations as well as PIE results, in-pile behaviour tests with solid solutions or composites, and relevant data for geological disposal of spent-IMF.

- B-1.3.1** 17:00 **Invited** INERT MATRICES FOR TRANSMUTATION AND UTILISATION OF PLUTONIUM, **G. Ledergerber** et al., Paul Scherrer Institute, Laboratory for Materials Behaviour, 5232 Villigen PSI, Switzerland
- B-1.3.2** 17:30 THE IRRADIATION OF INERT-MATRIX FUEL IN COMPARISON TO MOX FUEL AT THE HALDEN REACTOR, U. Kasemeyer, OECD Halden Project, on leave from the Paul Scherrer Institute (PSI), Switzerland, Y.-W. Lee, KAERI, G. Ledergerber, PSI, D.S. Sohn, KAERI, G. Gates, BNFL, Ch. Hellwig, PSI, W. Wiesenack, OECD Halden Project
- B-1.3.3** 17:45 MODELLING THE BEHAVIOUR OF INERT MATRIX FUELS USING DATA FROM RECENT HFR EXPERIMENTS, K. Bakker, E.A.C. Neef, R.P.C. Schram, NRG Petten, P.O. Box 25, 1755 ZG Petten, The Netherlands, R. Conrad, European Commission, Institute for Advanced Materials, P.O. Box 2, 1755 ZG Petten, The Netherlands
- B-1.3.4** 18:00 CURRENT STATUS OF RESEARCHES ON PLUTONIUM ROCK-LIKE OXIDE FUEL AND ITS BURNING IN LWRs, T. Yamashita, H. Akie, Y. Nakano, K. Kuramoto, N. Nitani and T. Nakamura, Atomic Energy Research Institute, Tokai, Ibaraki 319-1195, Japan
- B-1.3.5** 18:15 POST-IRRADIATION EXAMINATION OF URANIUM-BASED ROCK LIKE OXIDE FUEL, K. Kuramoto, T. Yamashita and T. Shiratori, Japan Atomic Energy Research Institute, Tokai, Ibaraki 319-1195, Japan

Wednesday, 31 May 2000

Mercredi 31 mai 2000

Afternoon

Après-midi

Session 1.3 - IMF Dispositions (continued)

Chairpersons: Ch. Brown (BNFL) - G. Lumpkin (ANSTO)

- B-1.3.6** 14:00 ASSESSMENT OF STRATEGIES FOR TRANSMUTATION OF ACTINIDES AND LONG-LIVED FISSION PRODUCTS, R.J.M. Konings, European Commission, Joint Research Centre, Institute for Transuranium Elements P.O. Box 2340, 76125 Karlsruhe, Germany and J.L. Kloosterman, Interfaculty Reactor Institute, Delft University of Technology, Mekelweg 15, 2629 JB Delft, The Netherlands
- B-1.3.7** 14:15 POST IRRADIATION EXAMINATION OF IRRADIATED INERT MATRIX/UO₂ MIXTURES WITH DIFFERENT DISPERSIONS, E.A.C. Neeft, K. Bakker, H.A. Buurveld, H. Hein, J. Minkema, A. Paardekoooper, R.P.C. Schram, W.J. Tams, NRG Petten, The Netherlands, R. Conrad, JRC-IAM, The Netherlands; A. van Veen, IRI, Delft University of Technology, the Netherlands
- B-1.3.8** 14:30 EXPERIMENTAL STUDY AND MODELLING OF THE THERMOELASTIC BEHAVIOUR OF COMPOSITE FUEL IN REACTOR - EMPHASIS ON THERMHET EXPERIMENT, V. Georgenthum⁽¹⁾, J. Brillaud⁽²⁾, M. Pelletier⁽¹⁾, N. Chauvin⁽¹⁾, D. Plancq⁽¹⁾, ⁽¹⁾Département d'Études des Combustibles Commissariat à l'Énergie Atomique, Centre d'Études Nucléaires Cadarache, 13708 St Paul Lez Durance, ⁽²⁾Laboratoire de Mécanique et Physique des Matériaux, ENSMA Poitiers, Site du Futuroscope, BP 109, 86960 Futuroscope, France
- B-1.3.9** 14:45 COMPOSITE MATERIALS AND SYSTEMS AS ALTERNATIVE INERT MATRIX FUEL TO DISPOSE CIVIL AND WEAPON GRADE PLUTONIUM IN LIGHT WATER REACTORS, A.V. Vatulin, Y.A. Stetsky, Y.I. Trifonov, G.I. Khotyashov. State Scientific Center of Russian Federation, A.A. Bochvar All-Russia Scientific and Research Institute of Inorganic Materials (ARSRIIM), Po Box 369, 123060 VNIINM, Moscow, Russia
- B-1.3.10** 15:00 DISSOLUTION AND ANALYSIS OF ERBIUM DOPED CERMET FUELS, J.P. Coulon, R. Alloncle, A. Fily, CEA/CADARACHE, DRN/DER/SSAE, 13108 Saint Paul Lez Durance Cedex, France; F. Charrier, M. Salmon, M. Tabarant, T.B.H. Tran, CEA/SACLAY, DCC/DPE/SPCP/LAIE, 91191 Gif-sur-Yvette Cedex, France
- B-1.3.11** 15:15 EVALUATION ON CHEMICAL STATE OF IRRADIATED ROX FUELS BY SOLGASMIX-PV CODE, N. Nitani, K. Kuramoto and T. Yamashita, Japan Atomic Energy Research Institute, Tokai, Ibaraki 319-1195, Japan and T. Ohmichi, Research Organization for Informatin Science and Technology, Tokai, Ibaraki 319-1195, Japan
- B-1.3.12** 15:30 RADIOTOXICITY HAZARD OF U-FREE FUELS AFTER BURNING MINOR ACTINIDES IN LWR, A. Shelley⁽¹⁾, H.Akie⁽²⁾, H. Takano⁽²⁾, H. Sekimoto⁽¹⁾, ⁽¹⁾TIT, O-Okayama, Meguro-ku, Tokyo 152-8505, Japan, ⁽²⁾JAERI, Tokai-mura, Naka-gun, Ibaraki-ken 319-1185, Japan
- B-1.3.13** 15:45 THE INFLUENCE OF CARBONATE COMPLEXES ON THE SOLUBILITY OF ZIRCONIA: NEW EXPERIMENTAL DATA, M. Pouchon, E. Curti, C. Degueudre and L. Tobler, Paul Scherrer Institut, 5232 Villigen PSI, Switzerland
- B-1.3.14** 16:00 CRYSTAL CHEMISTRY AND DURABILITY OF THE SPINEL STRUCTURE TYPE IN NATURAL SYSTEMS, G. R. Lumpkin, Materials Division, Australian Nuclear Science and Technology Organisation, PMB 1, Menai, NSW 2234, Australia
- 16:15 **BREAK**

16:30-18:30

Panel discussion

Introduction : C. Degueldre

On the basis of relevant fuel properties and strategies, the introduction to the discussion deals with comparison of relevant properties of materials: e.g. T_M Vs. K , penetration depth and swelling for given ion doses, O potential in spent fuel and solubility... The followed strategy: i.e. once-through-then-out or multi-recycling dictates the IMF choice as well as the irradiation strategy...

Moderators: R. Konings (ITU), G. Rouvière (COGEMA), NN', NN''

Topics: as complement of the 4th IMF guiding line, new trend in R&D...

Thursday, June 1, 2000

Jeudi 1^{er} juin 2000

Morning

Après-midi

2 - Reactor science

Session 2.1 - Sensitivity & Benchmark

Chairpersons: A. Stanculescu (IAEA) - D. Hittner (Framatome)

Topics : IMF utilisation in reactors requires fine, precise, accurate neutronics data and excellent calculation tools. The session concerns important results from the related benchmark exercises as well as specific studies performed to enhance the quality of neutronics data and of calculation results.

- B-2.1.1** 8:30 **Invited** A NUMERICAL NEUTRONICS BENCHMARK STUDY FOR INERT MATRIX PUFUELS IN UO₂ AND MOX ENVIRONMENTS, **J.M. Paratte**, R. Chawla, Paul Scherrer Institut, 5232 Villigen-PSI, Switzerland, H. Akie, JAERI, Ibaraki-ken 319-11, Japan, P.M.G. Damen, NRG, 1755 ZG Petten, The Netherlands, H.K. Joo, KAERI, P.O.Box 105, Yusung, Taejon 305-600, Korea, P. Mikolas, SKODA, Orlik 266, 316 06 Plzen, Czech Republic, E. Padovani, Polytechnic of Milan, via Ponzio 34/3, 20133 Milano, Italy, Y. Peneliau, CEA Saclay, 91191 Gif sur Yvette, France, G. Youinou, CEA Cadarache, 13108 St Paul lez Durance, France
- B-2.1.2** 9:00 DOPPLER EFFECT EXPERIMENT OF RESONANCE MATERIALS FOR ROX FUELS, Y. Nakano, M. Andoh, S. Okajima, H. Takano and H. Akie, Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken 319-1195, Japan
- B-2.1.3** 9:15 ERBIUM: ALTERNATIVE BURNABLE ABSORBER? STABILIZING ADDITIVE? WHAT IS THE FUTURE?, J. Porta⁽¹⁾, M. Asou⁽²⁾, ⁽¹⁾CEA/DRN/DER/SERSI Bat. 212 CE Cadarache, 13108 St. Paul lez Durance Cedex, France; ⁽²⁾CEA/DRN/DCP
- B-2.1.4** 9:30 IMPORTANCE OF ZIRCONIUM CROSS SECTION IN CALCULATING REACTIVITY EFFECTS FOR INERT MATRIX LWR FUELS, S. Baldi⁽¹⁾, J. Porta⁽¹⁾, Y. Peneliau⁽²⁾, S. Pelloni⁽³⁾, R. Chawla^(3,4), J.-M. Paratte⁽³⁾; ⁽¹⁾CEA/DRN/DER/SERSI, Bat. 212 CE Cadarache, 13108 St. Paul lez Durance Cedex, France; ⁽²⁾CEA/DRN/DMT/SERMA, Bat. 470 CE Saclay, 91191 Gif/Yvette Cedex, France; ⁽³⁾Paul Scherrer Institute, NES/LRS, 5232 Villigen PSI, Switzerland; ⁽⁴⁾Swiss Federal Institute of Technology, 1015 Lausanne, Switzerland
- B-2.1.5** 9:45 BENCHMARK CALCULATIONS OF FAST REACTOR CORE WITH URANIUM-FREE FUEL AND INERT MATRIX, I. Yu. Krivitski, Institute for Physics and Power Engineering, Obninsk, Russia
- B-2.1.6** 10:00 ERBIUM REACTIVITY WORTH: QUALIFICATION FOR BEGENING OF CYCLE, J. Porta⁽¹⁾, S. Baldi⁽¹⁾, J-P. Chauvin⁽¹⁾, Ph. Fougeras⁽²⁾; ⁽¹⁾CEA/DRN/DER/SERSI Bat 212; ⁽²⁾CEA/DRN/DER/SPEX Bat 238, CE Cadarache, 13108 St. Paul lez Durance Cedex, France
- B-2.1.7** 10:15 INTEGRAL MEASUREMENTS WITH A PLUTONIUM INERT MATRIX FUEL ROD IN A HETEROGENEOUS LWR TEST LATTICE, R. Chawla, F. Jatuff, P. Heimgartner et al., Paul Scherrer Institut, 5232 Villigen PSI, Switzerland
- 10:30 **BREAK**

Session 2.2 - Transient & safety

Chairpersons : J. Porta (CEA) – V. Troyanov (IPPE)

Topics : IMF utilisation in reactors requires excellent modelling tool for full safety under operation. The session concerns the dynamic aspects of IMF utilisation.

- B-2.2.1** 11:00 **Invited** AN OVERVIEW OF RIA BEHAVIOR STUDY OF ROCK-LIKE FUEL PWR, **H. Akie**, T. Nakamura, et al., Japan Atomic Energy Research Institute, Tokai-mura, Ibaraki-ken 319-1195, Japan
- B-2.2.2** 11:30 DYNAMICS ASPECTS OF PLUTONIUM RECYCLING IN AN INERT MATRIX, P.M.G. Damen, NRG, PO Box 25, 1755 ZG Petten, The Netherlands and J.L. Kloosterman, Interfaculty Reactor Institute, Delft University of Technology, Mekelweg 15, 2629 JB Delft, The Netherlands
- B-2.2.3** 11:45 ELEMENTS OF COMPARISON BETWEEN DIFFERENT INERT MATRIX FUELS AS REGARDS PLUTONIUM UTILISATION AND SAFETY COEFFICIENTS, S. Baldi, J. Porta, CEA/DRN/DER/SERSI, Bat. 212 CE Cadarache, 13108 St. Paul lez Durance Cedex, France
- B-2.2.4** 12:00 CERMET FUEL IN LWR: THE POSSIBLE WAY TO IMPROVE SAFETY (PART I), V. Troyanov, V. Popov, Inst. of Physics and Power Engineering, Obninsk, Russia
- 12:15 **LUNCH**

Thursday, June 1, 2000

Jeudi 1^{er} juin 2000

Afternoon

Après-midi

Session 2.2 - Transient & safety (continued)

Chairpersons : J. Porta (CEA) – V. Troyanov (IPPE)

- B-2.2.5** 13:45 PROGRESS IN CORE AND FUEL MODELIZATION TO CALCULATE SEVERE ACCIDENTS, J. Porta, S. Baldi, M. Bonnet, CEA/DRN/DER/SERSI, Bat. 212, CE Cadarache, 13108 St. Paul lez Durance Cedex, France
- B-2.2.6** 14:00 ROCK-LIKE OXIDE FUEL BEHAVIOR UNDER RIA CONDITIONS, T. Nakamura, K. Kusagaya, M. Yoshinaga, H. Uetsuka and T. Yamashita, Japan atomic Energy research Institute, Tokai-mura, Naka-gun, Ibaraki-ken 319-1195, Japan
- B-2.2.7** 14:15 CERMET FUEL IN LWR: THE POSSIBLE WAY TO IMPROVE SAFETY (PART II), V. Troyanov, V. Popov, Inst. of Physics and Power Engineering, Obninsk, Russia
- B-2.2.8** 14:30 NEUTRONIC AND SAFETY ASPECTS OF INERT MATRIX FUEL UTILIZATION IN FAST REACTORS FOR PLUTONIUM AND MINOR ACTINIDES TRANSMUTATION, I. Yu. Krivitski, M.F. Vorotyntsev, L.V. Korobeinikova, V. K. Pyshin, Institute for Physics and Power Engineering, Obninsk, Russia
- 14:45 **BREAK**

Session 2.3 - Conceptual studies

Chairpersons: **A. Lombardi (PoliMilano) - T. Yamashita (JAERI)**

Topics : This session explores the potential uses of IMF in advanced reactors or systems. The session deals with important concepts to optimise their utilisation in a more global way.

- B-2.3.1** 15:15 **Invited** THE ROLE OF IMF AND OTHER FUELS IN NUCLEAR ENERGY, **Y. Ronen**, Department of Nuclear Engineering, Ben-Gurion University of the Negev, Beer-Sheva, Israel
- B-2.3.2** 15:45 INERT MATRIX AND THORIA FUELS FOR PLUTONIUM ELIMINATION, **C. Lombardi**, L. Luzzi, E. Padovani, Polytechnic of Milan, Dept. of Nuclear Engineering, via Ponzio 34/3, 20133 Milano, Italy and F. Vettraino, ENEA, Nuclear Fission Division, via Martiri di Monte Sole 4, 40129 Bologna, Italy
- B-2.3.3** 16:00 DEVELOPMENT OF INERT MATRIX FUEL: AN INDIAN PERSPECTIVE, **S. Majumdar**, A.K. Sengupta, D.S.C. Purushotham and Anil Kakodkar, Bhabha Atomic Research Centre, Mumbai 400085, India
- B-2.3.4** 16:15 SCENARIO STUDIES WITH INERT MATRIX FUEL AT CEA/DRN, **J.-Y. Doriath**, CEA/DRN/DER/SPRC/LECy
- B-2.3.5** 16:30 SPECIFIC FUEL ROD THERMOMECHANICAL STUDIES FOR THE APA CONCEPT, **J. Brochard**⁽¹⁾, **J. Bergeron**⁽²⁾, **S. Bourreau**⁽¹⁾, **N. Hourdequin**⁽¹⁾, **F. Bentejac**⁽¹⁾, ⁽¹⁾CEA/Saclay, DRN/DMT/SEMI, 91191 Gif S/Yvette Cedex, France, ⁽²⁾CEA/Saclay, DRN/DMT/SERMA, 91191 Gif S/Yvette Cedex, France
- B-2.3.6** 16:45 PROGRESS IN THE APA (ADVANCED PU ASSEMBLY) STUDIES, **A. Puill**⁽¹⁾, **J. Bergeron**⁽¹⁾, **M. Rohart**⁽¹⁾, **S. Aniel-Buchheit**⁽¹⁾ and **P. Matheron**⁽²⁾, ⁽¹⁾CEA/Saclay, DRN/DMT/SERMA, 91191 Gif sur Yvette Cedex, France, ⁽²⁾CEA/Cadarache, DRN/DEC/SPU, 13108 Saint Paul-lez-Durance Cedex, France
- B-2.3.7** 17:00 COATED PARTICLE FUEL TO IMPROVE SAFETY, DESIGN, ECONOMIC, IN WATER-COOLED AND GAS-COOLED REACTOR, **J. Porta**, **P. Lo Pinto**, CEA DRN/DER/SERSI, Bat. 212 CE Cadarache, 13108 St. Paul lez Durance, France, **Z. Alkan**, **K. Kugeler**, Lehrstuhl für Reaktorsicherheit und -technik, RWTH Aachen/ ISR, FZ Jülich, Germany
- B-2.3.8** 17:15 HTR FUEL AS A VERY EFFICIENT SOLUTION FOR BURNING PLUTONIUM, **P. Guillermier**, **D. Hittner**, FRAMATOME, Tour Framatome, 1 place de la coupole, 92084 Paris la Défense, France
- B-2.3.9** 17:30 FUEL REQUIREMENT FOR HIGH TEMPERATURE REACTOR, **Ph. Chapelot** CEA/DRN/DER/SERSI Bat. 212 CE Cadarache 13108 St Paul lez Durance CEDEX, France, **D. Hitner**, Framatome, La Defense, 1 place de la coupole, 92084 Paris la Défense, France
- B-2.3.10** 17:45 SILICON CARBIDE ENCAPSULATED LWR FUEL PELLETS, **Z. Alkan**, **K. Kugeler**, **C. Manter**, **R. Kaulbarsch**, Lehrstuhl für Reaktorsicherheit und -technik, RWTH Aachen/ ISR, FZ Jülich, Germany

18:00-19:30

Panel discussion

Introduction : J. Porta

Moderators: R. Chawla? (EPFL-PSI) - D. Hittner? (Framatome) - NN

Topics: mass HeavyMetal, fission rate units? Volume of HM. Status of R&D activities.

END OF SYMPOSIUM B.