

(A32)

**The relationship between solid solubility range (z) and intergranular phase chemistry of  $\alpha/\beta$  SiAlON-TiN composites**N. Calis Acikbas<sup>1</sup> and O. Demir<sup>1</sup><sup>1</sup>*Bilecik University, Faculty of Engineering, Department of Mechanical and Manufacturing Engineering, Bilecik***ABSTRACT**

The z value has very effective parameter on mechanical and chemical properties of SiAlON ceramics. Although the researches on the affect of z value on density, fracture toughness, hardness, thermal shock resistance, strength, wear resistance of SiAlONs has made great progress, the relationship between z value and intergranular phase chemistry (amorphous or crystalline) has not been emphasized yet. Such understanding is necessary in order to further improve chemical wear resistance of SiAlONs. Previous studies showed that it is difficult to obtain crystalline intergranular phase with high z ( $\geq 0.5$ ) SiAlON, so that very limited studies existed on this phenomena. In order to meet such aim, TiN reinforced  $\alpha/\beta$ -SiAlONs (25 $\alpha'$ :75 $\beta'$ ) has been produced by using different dopant systems (Y:Sm:Ca, Yb:Sm:Ca, Er:Sm:Ca) with varying amount of intergranular phase. The relationship between z value and intergranular phase chemistry depending on used dopant system and intergranular phase content will be presented. Further, variations in sintering aid contents on density, hardness and fracture toughness will be analysed and related to z values.



**Institut des Sciences Chimiques de Rennes**

UMR CNRS 6226

équipe "Verres et Céramiques" - case 1007

35042 Rennes Cedex, France

Tél.: +33 2 23 23 62 56

Fax: +33 2 23 23 56 83

Franck.Tessier@univ-rennes1.fr

**Franck Tessier**

*Chargé de Recherche CNRS*

Rennes, March 13 2012

### **International Symposium on Nitrides (ISNT 2012)**

<http://isnt2012.univ-rennes1.fr>

Dear Colleague,

I have the pleasure to announce that your communication has been accepted as **an oral presentation**.

The relationship between solid solubility range ( $z$ ) and intergranular phase chemistry of  $\alpha/\beta$  SiAlON-TiN composites

It is strictly recommended to design your talk for 12 min + 3 min for questions. A laptop will be available for your presentation. Presentations will be loaded before each session and then deleted.

As we can accept more posters, please feel free to submit a complementary abstract.

We advise you to complete your registration now and to book your hotel as soon possible, as St Malo is a busy resort.

Informations related to the meeting are displayed on the website and on our Facebook page.

Thanking you again for attending ISNT 2012 and waiting to meet with you in St Malo

Sincerely,

**Franck Tessier**

Chairman ISNT 2012



# 7th International Symposium on NITRIDES

June 3-6, 2012  
Saint Malo



Institut des Sciences Chimiques de Rennes  
UMR CNRS 6226 - Université de Rennes 1  
Rennes, France

## **INTERNATIONAL ADVISORY BOARD**

---

---

R. Dronskowski	RWTH Aachen University	GERMANY
A. Fuertes	CSIC-Barcelona	SPAIN
S. Hampshire	University of Limerick	IRELAND
H. Hintzen	Eindhoven University of Technology	The NETHERLANDS
M. Hoffmann	Karlsruhe Institute of Technology	GERMANY
S. Kikkawa	Hokkaido University	JAPAN
H.T. Lin	Oak Ridge National Laboratory	USA
W. Lengauer	Technische Universität Wien	AUSTRIA
H. Mandal	Sabancı University	TURKEY
P. Miele	IEM - Université Montpellier 2	FRANCE
R. Riedel	Technische Universität Darmstadt	GERMANY
T. Rouxel	Université de Rennes 1	FRANCE
P. Šajgalík	Slovak Academy of Sciences	SLOVAKIA

## **LOCAL ORGANIZING COMMITTEE**

---

---

Dr. Franck Tessier

---

Corinne Perier

---

Dr. François Cheviré

---

Nathalie Herbert

---

Dr. Ronan Lebullenger

---

Michel Lecroc

---

Dr. Odile Merdrignac-Conanec

---

Prof. Jean Rocherullé

## CHAIRMAN

---

---

### **Dr. Franck Tessier**

Institut des Sciences Chimiques de Rennes  
Equipe Verres et Céramiques  
CNRS - Université de Rennes 1

franck.tessier@univ-rennes1.fr

## INVITED SPEAKERS

---

---

S. Bernard	IEM - Université Montpellier 2	FRANCE
S. Kikkawa	Hokkaido University	JAPAN
W. Lengauer	Technische Universität Wien	AUSTRIA
A. Fuertes	CSIC-Barcelona	SPAIN
P. Šajgalik	Slovak Academy of Sciences	SLOVAKIA
R. Riedel	Technische Universität Darmstadt	GERMANY
R. Dronskowski	RWTH Aachen University	GERMANY
H. Hintzen	Eindhoven University of Technology	The NETHERLANDS
J.-C. Sangleboeuf	Université de Rennes 1	FRANCE
M. Hoffmann	Karlsruhe Institute of Technology	GERMANY

## CONFERENCE PROGRAMME

### DAY ONE : SUNDAY, JUNE 3, 2012

Time

17:00 – 19:00 REGISTRATION – Rotonde Surcouf (Level 2)

18:00 – 20:00 WELCOME RECEPTION

### DAY TWO : MONDAY, JUNE 4, 2012

Time

08:15 – 08:30 Opening address

Tessier F.

Conference Chairman

#### SESSION A1 THERMOCHEMISTRY, CRYSTAL STRUCTURES AND THEORITICAL STUDIES

Chairmen : Fuertes A. and Gautier R.

- |               |                |                                                                                                                                                                            |
|---------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 08:30 – 09:00 | Kikkawa S.     | <b>Structural studies on dielectric SrTaO<sub>2</sub>N and superconducting (Nb<sub>0.9</sub>M<sub>0.1</sub>)(N<sub>0.9</sub>O<sub>0.1</sub>) where M = Mg, Al or Si</b>    |
| 09:00 – 09:15 | Yamane H.      | Crystal structure of (Sr <sub>0.94</sub> Eu <sub>0.06</sub> )(Al <sub>0.3</sub> Si <sub>0.7</sub> ) <sub>4</sub> (N <sub>0.8</sub> O <sub>0.2</sub> ) <sub>6</sub>         |
| 09:15 – 09:30 | Moriga T.      | Substitution effects of La <sup>3+</sup> by Ba <sup>2+</sup> in LaTaON <sub>2</sub> oxynitride on the structural and optical properties                                    |
| 09:30 – 10:00 | Dronskowski R. | <b>Ab initio thermochemistry of solids</b>                                                                                                                                 |
| 10:00 – 10:15 | Orisakwe E.    | A theoretical study of the electronic structure of AMN <sub>2</sub> (A = alkaline earth-metal, M = group 4 metal) nitrides                                                 |
| 10:15 – 10:30 | Even J.        | General description of non-linear electro-elastic coupling, including symmetry analysis and DFT calculations applied to nitride semiconductor compounds and nanostructures |

10:30 – 11:00 COFFEE BREAK

#### SESSION A2 NOVEL MATERIALS AND SYNTHETIC ADVANCES 1

Chairman : Takeda T. and Merdrignac-Conanec O.

- |               |              |                                                                                                                  |
|---------------|--------------|------------------------------------------------------------------------------------------------------------------|
| 11:00 – 11:15 | Jobic S.     | P-type nitrogen doped ZnO nanoparticles: from dream to reality ?                                                 |
| 11:15 – 11:30 | Masubuchi Y. | Hexagonal gallium oxynitride nanowire : its structure and optical properties                                     |
| 11:30 – 11:45 | Giordano C.  | Metal nitrides and oxynitrides: from nanopowders to nanocomposites                                               |
| 11:45 – 12:00 | Watanabe T.  | Ammonothermal synthesis of LaTaON <sub>2</sub>                                                                   |
| 12:00 – 12:15 | Segales M.   | Novel nanostructures of lithium nitride: metal catalysed nanofibre growth and nanocomposites with porous carbons |

12:30 – 14:00 LUNCH

**SESSION A3 SILICON NITRIDE AND SiAlON CERAMICS 1**

---

**Chairman : Hampshire S.**

14:00 - 14:30	Šajgalík P.	<b>Functionalization of nitride engineering ceramics by polymer derived sintering aids</b>
14:30 - 14:45	Calloch P.	Reaction and sintering of a SiAlON-TiN body fabricated from a novel $Ti_xAl_y$ intermediate
14:45 - 15:00	Calis Acikbas N.	The relationship between solid solubility range (z) and intergranular phase chemistry of $\alpha/\beta$ SiAlON-TiN composites

**15:00 - 15:30 COFFEE BREAK**

**SESSION A4 FUNCTIONAL MATERIALS FOR ENERGY AND ENVIRONMENT 1**

---

**Chairmen : Weidenkaff A. and Kikkawa S.**

15:30 - 16:00	Riedel R.	<b>Functional nitrides for energy applications</b>
16:00 - 16:15	Emery N.	Interest of the 2D and 3D lithiated metallic nitrides as intercalation compounds for Li-ion batteries
16:15 - 16:30	Lucio Porto R.	Vanadium and manganese nitrides thin films for supercapacitors
16:30 - 16:45	Panabière E.	Chemical stability of layered lithium cobalt nitrides in air
16:45 - 17:15	Hintzen H.	<b>Nitrides for sustainable energy technologies</b>
17:15 - 17:30	Takeda T.	Codoping effect on Mn doped $\gamma$ -AlON phosphor
17:30 - 17:45	Lences Z.	Europium and cerium-doped ternary silicon nitrides phosphors
17:45 - 18:00	Yuan S.	Preparation and photoluminescence characteristics of $Sr_2Si_5N_8:Eu$ and $M_{x-z}La_{10-x}Si_6O_{27-x/2-3y/2}N_y:Eu_z$ (M = Ca, Sr; x = 2, 3, 4) phosphors via an alkaline earth carbodiimides route

**18:00 - 20:00 POSTER SESSION**

Posters will be displayed in room Vauban from Sunday evening to Wednesday morning.

---