



Strasbourg (France)

E-MRS Spring Meeting 2004
May 24-28, 2004

SYMPOSIUM P

Filled and nano-composite polymer materials

Symposium Organizers:

Rex Hjelm, Los Alamos National Laboratory, USA

François Tsohnang, Institut Supérieur des Matériaux et Mécaniques
Avancés, Le Mans, France

Michel Gerspacher, Fort Worth Research Center, USA

Robert Schuster, Deutsches Institut Für Kautschuktechnologie,
Hannover, Germany

Dietmar Goeritz, University of Regensburg, Germany

Papers will be published in Composites Part A:
Applied Science and Manufacturing

E-MRS 2004 SPRING MEETING

SYMPOSIUM P

Tuesday, May 25, 2004

Morning

- 09:00 INTRODUCTION OF THE SYMPOSIUM
by all Co-Chairs
- 09:30 Keynote address:
AROUND FILLED POLYMERS, NANO-COMPOSITES POLYMERS AND MACROSCOPIC
PROPERTIES
Alain le Méhauté, L. Nivanen and A. Wang, ISMANS, 44 avenue Bartholdi, 72000 Le Mans, France
- 10:10 **BREAK**

Session I: Theoretical developments and modeling of properties

Session chair: R.P. Hjelm

- P-I.02** 10:40 -Invited- NANOSTRUCTURES IN POLYMERS AND POLYMER/INORGANIC HYBRIDS FROM ADVANCED
SOLID STATE NMR
H.W. Spiess, Max-Planck-Institute for Polymer Research, PO Box 3126, 55021 Mainz, Germany
- P-I.01** 11:20 -Invited- A MINIMAL MODEL FOR UNDERSTANDING THE COMPETITION BETWEEN EQUILIBRIUM
CLUSTERING AND PHASE SEPARATION IN NANOPARTICLE DISPERSIONS
Jack Douglass, National Institutes of Standards and Technology, Gaithersburg, Maryland, USA
- P-I.03** 12:00 -Invited- A MULTIFRACTAL ANALYSIS OF RUBBER SURFACES
Claude Tricot, Département de Mathématiques, Université Blaise Pascal (Clermont-Ferrand), 63177
Aubière Cedex, France
- 12:40 **LUNCH**

Tuesday, May 25, 2004

Afternoon

Session II: Polymer surface interactions and adhesion

Session chair: S. Blazewicz

- P-II.01** 14:00 -Invited- CONTROLLING ADHESION AND MOTION OF NANOPARTICLES WITH SURFACE-ATTACHED POLYMER MONOLAYERS
Jürgen Rühle, IMTEK – Insitute for Microsystem Technology, University of Freiburg, 79110 Freiburg, Germany
- P-II.02** 14:40 -Invited- INTERACTIONS OF PMMA ON A SURFACE ENVISIONED BY MOLECULAR MODELING
Armand Soldera, Département de Chimie, Université de Sherbrooke, Sherbrooke J1K 2R1, Canada
- P-II.03** 15:20 COMPARED STUDY OF COOPERATIVITY IN POLYMER THIN FILMS AND NANOCOMPOSITES
T. Anh Tran, S. Said, Y. Grohens, Laboratoire Polymères et Procédés (L2P), Centre de Recherche, BP 92116, Rue de Saint Maudé, 56321 Lorient Cedex, France
- P-II.04** 15:40 POLYMER-FILLER INTERACTIONS IN KAOLIN/NYLON 6,6 COMPOSITES CONTAINING A SILANE COUPLING AGENT
M. Buggy, G. Bradley and Ann Sullivan, Department of Materials Science and Technology, University of Limerick, Ireland
- P-II.05** 16:00 MICROSTRUCTURE OF MONTMORILLONITE BASED NANOCOMPOSITE POLYMERS: AN ATOMISTIC STUDY OF GRAFTED POLYMER – ORGANOMODIFIED NANOFILLERS INTERACTIONS
E. Tsobnang, B. Minisini, Institut Supérieur des Matériaux et Mécaniques Avancés du Mans, 44 Av. F.A. Bartholdi, 72000 Le Mans, France
- 16:20 **BREAK**

Session III: Fillers development

Session chair: M. Gerspacher

- P-III.01** 16:40 -Invited- PLASMA CARBON BLACK - THE NEW ACTIVE ADDITIVE FOR PLASTICS
T. Zielinski, J. Kijenski, Industrial Chemistry Research Institute, Rydygiera 8, 01-793 Warsaw, Poland
- P-III.02** 17:20 -Invited- IMPORTANCE OF NITROGEN DOPING OF THE CARBONS USED IN THE PREPARATION OF NON-PRECIOUS METAL CATALYSTS FOR PEM FUEL CELLS
Jean-Pol Dodelet, INRS-Énergie, Matériaux et Télécommunications, Varennes, QC, J3X 1S2, Canada
- P-III.03** 18:00 MORPHOLOGY OF ADSORBED RUBBER ON CARBON BLACK
Richard Hofmann, Dietmar Göritz, Faculty of Physics, University of Regensburg, 93040 Regensburg, Germany
- P-III.04** 18:20 CARBON BLACK MODIFICATION BY ATMOSPHERIC PLASMA
N. Tricás(a), S. Borrós(b), R.H. Schuster(a), (a)Deutsches Institut für Kautschuktechnologie e.V., eupener Straße 33, 30519 Hannover, Germany, (b)Institut Químic de Sarrià, Av. Sarrià 390, 08017 Barcelona, Spain
- P-III.05** 18:40 CARBON NANOTUBES - POTENTIAL CANDIDATES FOR THE IMPROVEMENT OF MECHANICAL PROPERTIES OF EPOXY MATRICES
Florian H. Gojny, Bodo Fiedler, Malte H.G. Wichmann, Karl Schulte, Technical University Hamburg-Harburg, Polymer Composites Section, Denickestrasse 15, 21073 Hamburg, Germany

Wednesday, May 26, 2004

Afternoon

Session IV: Filled elastomeric and structural materials

Session chair: D. Goeritz

- P-IV.01** 14:00 -Invited- MICROSCOPIC ORIGIN OF ENERGY STORAGE AND DISSIPATION IN FILLER REINFORCED RUBBERS
Manfred Klueppel, Jens Meier, Michael Daemgen, Deutsches Institut für Kautschuktechnologie e. V., Eupener Strasse 33, 30519 Hannover, Germany
- P-IV.02** 14:40 -Invited- THE EFFECT OF FILLER-FILLER AND FILLER-ELASTOMER INTERACTION ON RUBBER REINFORCEMENT
Joachim Fröhlich, Degussa AG, Applied Technology, Harry-Kloepfer-Straße 1, 50997 Köln, Germany
- P-IV.03** 15:20 INFLUENCE OF NANO-FILLER SURFACE MODIFICATIONS ON DYNAMIC-MECHANICAL PROPERTIES AND FILLER DISTRIBUTION IN POLYMER BLENDS
J. Zieger, J. Meier and **R.H. Schuster**, Deutsches Institut für Kautschuktechnologie e.V., Eupener Str. 33, 30519 Hannover, Germany
- P-IV.04** 15:40 ELABORATION AND THERMAL STABILITY STUDIES OF COLD PLASMA POLYMERIZED COATINGS
I. Errifai, **C. Jama**, R. Delobel, Laboratoire PERF UPRES 1040, ENSCL, BP 108, 59650 Villeneuve d'Ascq, France, L. Gengembre, Laboratoire de Catalyse de Lille CNRS UMR 8010, USTL, 59655 Villeneuve d'Ascq, France, A. Mazzah and R. De Jaeger, LASIR UPR CNRS UMR 8516, USTL, 59655 Villeneuve d'Ascq, France
- P-IV.05** 16:00 THERMAL STABILITY AND MECHANICAL PROPERTIES OF BIODEGRADABLE POLYLACTIDE/MONTMORILLONITE NANOCOMPOSITE
Jidong He(a), Cheng Chen(a), Hongliang Kang(b), Man Ken Cheung(a) and Lisong Dong(b), (a)Department of Applied Biology & Chemical Technology, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, P.R. China, (b)State Key Laboratory of Polymer Physics and Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, P.R. China
- 16:20 **BREAK**

Session V: New materials developments

Session chair: R. Schuster

- P-V.01** 16:40 -Invited- TAILORING OF BIOCOMPATIBILITY OF POLYMER – BASED COMPOSITE BIOMATERIALS
S. Blazewicz, AGH University of Science and Technology, al. Mickiewicza 30, 30-059 Cracow, Poland
- P-V.02** 17:20 INNOVATIVE, SCRATCH PROOF NANOCOMPOSITES FOR CLEAR COATINGS
T. Graule, B.B ommer, J. Kürsteiner, O. Trzebiatowski, Swiss Federal Laboratories for Materials Testing and Research (Empa), Ueberlandstrasse 129, 8600 Dübendorf, Switzerland, W. Koch, Nanosys GmbH, 9427 Wolfhalden, Switzerland, B. Schmid, Basler Lacke AG, 5033 Buchs, Switzerland
- P-V.03** 17:40 SYNTHESIS OF NEW MACROAMORCORS BY OZONIZATION OF POLYFLUORIDE OF VINYLIDENE
A. Serdani, Laboratoire de chimie, Université de Skikda, **R. Messmoudi**, Faculty of Science, University of Setif, Algeria, A. Djebaili, Laboratoire d'Etude des Matériaux Polymères, B. Boutevin, URA CNRS D 11930, ENS-Chimie- Montpellier, France
- P-V.04** 18:00 SYNTHESIS AND APPLICATIONS OF GRAFT COPOLYMERS FROM OZONIZED POLY (VINYLIDENE FLUORIDE)
A. Serdani, Laboratoire de chimie, Université de Skikda, **N. Bourmada**, Faculty of Engineering Science, A. Djebaili, Laboratoire d'Etude des Matériaux Polymères, Z. Skanderi, Department of Chemistry, University of Batna, B. Boutevin, URA CNRS D 11930, ENS- Chimie- Montpellier, France
- P-V.05** 18:20 THE USE OF FILLERS AND NANOCOMPOSITES IN FIRE RETARDANCY
C. Jama, S. Duquesne, M. LeBras, R. Delobel, Laboratoire des Procédés d'Elaboration de Revêtements Fonctionnels, UPRES EA 1040, ENSCL, 59652 Villeneuve d'Ascq, France
- 18:40-19:00 POSTER'S SHORT ORAL PRESENTATION

- P/P.01** THE SPECTRAL PROPERTIES OF POLYMER DOPED AND COMPOSITE FILMS DEPENDING ON LEVEL OF DYE ASSOCIATION AND AGGREGATION
Sergey Svechnikov, Petro Smertenko, Larysa Fenenko, V. Lashkaryov Institute of Semiconductors Physics of NASU, 45, prospekt Nauki, 03028 Kyiv, Ukraine, Nikolay Davidenko, Kyiv Taras Shevchenko University NASU, 64 Volodymirskaja str., 01017 Kyiv, Ukraine, Alexandr Ishchenko, Institute of Organic Chemistry NASU, 5 Murmanskaya str., 02094 Kyiv, Ukraine, Michael Hietschold, Falk Mueller, Chemnitz University of Technology, Institute of Physics, 70 Reichenhainer Str., 09126 Chemnitz, Germany
- P/P.02** DONOR-ACCEPTOR INTRACTION IN ORGANIC POLYMER NANOCOMPOSITE FILMS WITH OXIDE OF transition metals V2O5
Sergey Svechnikov, Petro Smertenko, Larysa Fenenko, V. Lashkaryov Institute of Semiconductors Physics NASU, 45 prospekt Nauki, 03028 Kyiv, Ukraine, Nikolay Guba, Ludmila Grebinskaja, L.V. Pisarzhevski Institute of Physical Chemistry NASU, 31 prospekt Nauki, 03029 Kyiv, Ukraine, Sener Oktik, Ozge Tuzun, Mugla University, 48000 Kotecli, Mugla, Turkey
- P/P.03** ELECTRONIC STATES ALIGNMENT OF ZNPC, F16ZNPC AND ZNTPP ON SI(111):H IN VIEW OF SILICON/ORGANIC HYBRID MATERIALS FOR PHOTOVOLTAIC APPLICATIONS
U. Weiler, T. Mayer and W. Jaegermann, Darmstadt University of Technology, Department of Material Science, Surface Science Division Petersenstr. 23, 64287 Darmstadt, Germany
- P/P.04** THIN FILM COMPOSITES OF NANOCARBONS-POLYANILINE OBTAINED BY PLASMA POLYMERIZATION TECHNIQUE
Claudia Nastase, M. Ionescu, F. Nastase, and Ioan Stamatin University of Bucharest, Faculty of Physics, 3Nano-SAE Research Centre, Bucharest Magurele MG-11, Romania
- P/P.05** STRUCTURE AND PROPERTIES OF THE PLASMA POLYMERIZED FEROCENNE-PYRROLE FILMS
Florin Nastase, Claudia Nastase and Ioan Stamatin University of Bucharest, Faculty of Physics, 3Nano-SAE Research Centre, Bucharest Magurele MG-11, Romania
- P/P.06** CONDUCTIVE POLYMER NANO-COMPOSITES
Marion Wienecke, Mihaela-C. Bunescu, Marlis Pietrzak, K. Deistung, T. Barfels, H. Hansmann, Hochschule Wismar, Institut für Oberflächen- und Dünnschichttechnik, Philipp-Müller-Str., 23952 Wismar, Germany
- P/P.07** MICROSTRUCTURE OF MONTMORILLONITE BASED NANOCOMPOSITE POLYMERS : AN ATOMISTIC STUDY OF ORGANOMODIFIED NANOFILLERS
B. Minisini, Institut Supérieur des Matériaux et Mécaniques Avancés du Mans, 44 Av. F. A. Bartholdi, 72000 Le Mans, France

Thursday, May 27, 2004

Afternoon

Session VI: Advanced characterization techniques (1)

Session chair: P. Bertrand

- P-VI.01** 08:30 -Invited- STRUCTURE ANALYSIS OF POLYMER/NANOPARTICLE COMPOSITES
H. Hasegawa, Department of Polymer Chemistry, Kyoto University, Nishikyo-ku, Kyoto 615-8510, Japan
- P-VI.02** 09:10 -Invited- MECHANISTIC MODELING OF THE REINFORCEMENT AND NONLINEARITY IN NANOFILLED POLYMERS ABOVE THE GLASS TRANSITION TEMPERATURE
S.S. Sternstein, Bing Jiang, Materials Science and Engineering Department, Rensselaer Polytechnic Institute, Troy, NY 12181, USA
- P-VI.03** 10:00 MICROSTRUCTURE AND MORPHOLOGY OF NIMESULIDE-CROSPVIDONE NANOCOMPOSITES BY RAMAN AND ELECTRON MICROSCOPES
P. Bergese, I. Alessandri and L.E. Depero, INSTM and Structural Chemistry Laboratory, University of Brescia, via Branze 38, 25123 Brescia, Italy, I. Colombo, Eurand S.p.A., Physical Pharmacy Laboratory, via Martin Luther King 13, 20060 Pessano con Bornago – Milano, Italy, N. Cocceani, Eurand S.p.A., via del Follatolo 12, 34148 Trieste, Italy
- 10:10 **BREAK**

Session VII: Advanced characterization techniques (2)

Session chair: C. Hasegawa

- P-VII.01** 10:40 -Invited- SIMS AND AFM CHARACTERIZATION OF POLYMER NANOCOMPOSITES
P. Bertrand(a), L. Kailas(a), B. Nysten(b), J.-N. Audinot(c), H.-N. Migeon(c), Université catholique de Louvain, (a)PCPM and (b)POLY, Croix du Sud 1, 1348 Louvain-la-Neuve, Belgium, (c)Laboratoire d'Analyse des Matériaux, CRP Gabriel Lippmann, avenue de la Faïencerie 162a, 1511 Luxembourg
- P-VII.02** 11:20 -Invited- AFM AND TENSILE MEASUREMENTS STUDIES OF PDMS AND POLY(ESTER URETHANE) COMPRESSION MOLDED SAMPLES
M.E. Hawley, Material Science and Technology Division, Los Alamos National Laboratory, USA
- P-VII.03** 12:00 DETERMINATION OF THE ELECTRICAL BEHAVIOUR OF SURFACTANT TREATED POLYMER/CARBON BLACK COMPOSITE GAS SENSORS
K. Arshak, E. Moore, L. Cavanagh, J. Harris, B. McConigly, C. Cunniffe, G. Lyons, S. Clifford, Electronic & Computer Engineering Dept., University of Limerick, Plassey Technological Park, Limerick, Ireland
- P-VII.04** 12:20 FRACTOGRAPHIC STUDY OF VINYLIDENE POLYFLUORIDE COPOLYMERS BY SCANNING ELECTRONIC MICROSCOPY
A. Serdani, Laboratoire de chimie, Université de Skikda, A. Sakri, Faculty of science, University of Setif, Algeria, A. Djebaili, Laboratoire d'Etude des Matériaux Polymères, M. Belloum, Department of Chemistry, University of Batna, B. Boutevin, URA CNRS D 11930, ENS- Chimie- Montpellier, France
- 12:40 **LUNCH**

Thursday, May 27, 2004

Afternoon

Session VIII: Advanced characterization techniques (3)

Session chair: L. Arleth

- P-VIII.01** 14:00 -Invited- MICROSTRUCTURE OF CARBON-BLACKS FROM X-RAY LINE BROADENING
T. Ungár(a), J. Gubicza(b), C. Pantea(c) and T.W. Zerda(c), (a)Department of General Physics, Eötvös University Budapest, Hungary, (b)Department of Solid State Physics, Eötvös University Budapest, Hungary, (c)Department of Materials Science, Cristian University, Fort Worth TX, USA
- P-VIII.02** 14:40 -Invited- AFM STUDIES OF CHAIN AGGREGATE STRETCHING AND BREAKING
S.K. Friedlander, Department of Chemical Engineering, University of California, Los Angeles, USA
- P-VIII.03** 15:20 VOLUME TRANSITION AND INTERNAL STRUCTURES OF SMALL POLY(N-ISOPROPYLACRYLAMIDE) MICROGELS
Rex P. Hjelm(a), Xiaohu Xia(b), Lise Arleth(a) Jianzhong Wu(c) and Zhibing Hu(b), (a)Manuel Lujan Jr. Neutron Scattering Center, H805, Los Alamos National Laboratory, Los Alamos NM 87545, USA, (b)Departments of Physics and Chemistry, University of North Texas, Denton TX 76203, USA, (c)Department of Chemical and Environmental Engineering, University of California, Riverside CA 92521, USA
- P-VIII.04** 15:40 CHARACTERIZATION OF POLYMERS FILLED BY NANO FILLOSILICATES
G. Giannotta, G.L. Marra, **L. Meda**, R. Po, Ist. Donegani Polimeri Europa, via Fauser 4, 28100 Novara, Italy
- 16:00 **BREAK**

Session IX: Advanced characterization techniques (4)

Session chair: W. Zerda

- P-IX.01** 16:20 -Invited- MICROSTRUCTURE OF CARBON BLACKS DETERMINED BY X-RAY DIFFRACTION PROFILE ANALYSIS
Tamás Ungár, Jenő Gubicza, Eötvös University, Deptment of General Physics, P.O.Box 32, 1518 Budapest, Hungary, Cristian Pantea and T. Waldek Zerda, TCU, Department of Physics, Fort Worth TX 76129, USA
- P-IX.02** 17:00 -Invited- DETAILED STRUCTURE OF HAIRY MICELLES FORMED IN PEGYLATED PHOSPHOLIPID SYSTEMS
Lise Arleth, Danish Polymer Centre, Riso National Laboratory, Denmark, Beena Ashok and Hayat Onyuksel, Department of Biopharmaceutical Sciences, College of Pharmacy, University of Illinois at Chicago IL, Pappannan Thiagarajan and Jaby Jacob, Argonne National Laboratory, Illinois, Rex P. Hjelm, Manuel Lujan Jr. Neutron Scattering Center, MS H805, Los Alamos National Laboratory, Los Alamos NM 87545, USA
- P-IX.03** 17:40 STUDY OF UNDOPED POLYACETYLENE BY DIFFERENTIAL SCANNING CALORIMETRY (D.S.C)
A. Djebaili, Laboratoire d'Etude des Matériaux Polymères, M. Belloum, Department of Chemistry, University of Batna, Y. Bouzaher, Laboratoire d'Etude des Matériaux Organiques, M.J.M. Abadie, Laboratoire d'étude des matériaux organique, France

Friday, May 28, 2004

Morning

Session X: Advanced nano composites for optical, electrical and magnetic applications(1)
Session chair: F. Tsobnang

- P-X.01** 08:30 -Invited- USING TRIAXIAL MAGNETIC FIELDS TO CREATE OPTIMAL PARTICLE COMPOSITES
James E. Martin, Robert A. Anderson, and Gerald Gulley, Sandia National Laboratories, Albuquerque NM 87185, USA
- P-X.02** 09:10 NANOCOMPOSITE ION CONDUCTING MEMBRANES
L. Pautrot, D. Carrière, P. Barboux, K. Lahlil, Physique de la Matière Condensée, Ecole Polytechnique, 91128 Palaiseau Cedex, France
- P-X.03** 09:30 ORGANIC ABSORBER CENTRES IN Si: AN ORGANIC INORGANIC COMPOSITE ABSORBER MATERIAL FOR THIN FILM SOLAR CELL APPLICATION
T. Mayer, U. Weiler and W. Jaegermann, Darmstadt University of Technology, Department of Material Science, Surface Science Division, Petersenstr. 23, 64287 Darmstadt, Germany
- P-X.04** 09:50 OPTICAL AND ELECTRICAL INVESTIGATIONS OF PPV/SIO₂ AND PPV/TIO₂ NANOCOMPOSITES
S.H. Yang, P. Le Rendu, T.P. Nguyen, Laboratoire de Physique Cristalline, Institut des Matériaux Jean Rouxel, 2 rue de la Houssinière, 44322 Nantes cedex 3, France
- 10:10 **BREAK**

Session XI: Advanced nano composites for optical, electrical and magnetic applications(2)
Session chair: J. Martin

- P-XI.01** 10:40 OPTICAL PROPERTIES OF POLY(2-METHOXY, 5-(2'-ETHYL-HEXYLOXY)-PHENYLENE VINYLENE) DEPOSITED ON POROUS ALUMINA SUBSTRATES
P. Le Rendu, S.H. Yang, T.P. Nguyen Laboratoire de Physique Cristalline, Institut des Matériaux Jean Rouxel, 2 rue de la Houssinière, 44322 Nantes cedex 3, France, H.R. Khan, Materials Physics Department FEM, Katharinenstraße 17, 73525 Schwäbisch Gmünd, Germany
- P-XI.02** 11:00 POLYMER REFRACTIVE INDEX VARIATION USING NANOSCALED CERAMICS OR ORGANIC DYES FOR APPLICATIONS IN POLYMER WAVEGUIDES
J. Böhm(a), J. Hausselt(a,b), E. Ritzhaupt-Kleissl(a), T. Hanemann(a), (a)Forschungszentrum Karlsruhe, Institute for Materials Research III, P.O. Box 3640, 76021 Karlsruhe, Germany, (b)Institute for Microsystem Technology, University of Freiburg, Germany
- P-XI.03** 11:20 IMPACT OF SYNTHESIS CONDITIONS ON THE ELECTRIC CONDUCTIVITY OF ORIENTED AND DOPED POLYACETYLENE
A. Djebaili, Laboratoire d'Etude des Matériaux Polymères, M. Goumadi, Faculty of Science, University of Ouargla, Algeria, M. Belloum, Department of Chemistry, University of Batna, Y. Bouzaher, Laboratoire d'Etude des Matériaux Organiques, M.J.M. Abadie, Laboratoire d'Etude des Matériaux Organique, France
- 11:40 Closing remarks
- 12:00 **LUNCH**