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TRACER 2

First International Congress
Second French Congress

on

TRACERS and TRACING METHODS

Program
and
Registration



29 - 31 May 2001

Nancy • France

<http://www.ensic.inpl-nancy.fr/tracer2>





PALAIS DES CONGRES

BP 663

54063 NANCY Cedex

Scientific objectives

The first congress on "Tracers and Tracing Methods" took place in Nancy in November 1998. We would like now to extend it to the international level. The objective of this congress is to present the current status and trends on tracing methods and their applications. It will give the opportunity to people from different fields to exchange scientific information and knowledge about tracer methodology and applications. The target participants are the researchers, engineers and technologists of various industrial and research sectors: chemical engineering, chemistry, environment, food engineering, bio-engineering, geology, hydrology, civil engineering, iron and steel production, etc.

Two sessions are planned to cover both fundamental and industrial aspects:

A • Fundamental development

- Tomography, tracer camera visualization and particles tracking
- Validation of Computational Fluid Dynamics simulations by tracer experiments and numerical Residence Time Distribution
- New tracers and detectors or improvement and development of existing tracing methods
- Data treatments and modeling

B • Industrial applications

- Geology, hydrogeology and oil field applications
- Civil engineering, mineral engineering and metallurgy applications
- Chemical engineering
- Environment
- Food engineering and Bio-engineering

Organisation



PROGEPI:

Center of Promotion
of Chemical Engineering in Industry

CPIC:

Chemical Industries
Training Center

Scientific Coordination

Mr Jean-Pierre LECLERC • PROGEPI-LSGC • BP 451 • 1, rue Grandville
54001 NANCY Cedex (France) • Tel.: (33) 3 83 17 50 66 • Fax: (33) 3 83 32 73 08
e.mail: leclerc@ensic.inpl-nancy.fr

PRACTICAL INFORMATION

➔ **Location of the meeting:** The technical sessions will be held at the
PALAIS DES CONGRES DE NANCY
Rue du Grand Rabbin Haguenauer
54000 NANCY

➔ **Registration fees (including proceedings, lunches and coffee breaks):**

- | | |
|-------------------------------------|--|
| • Simple Inscription: | • Inscription including gala night dinner and boat trip (May, 30th) |
| • Industrials: 2500 FRF (HT) | • Industrials: 2700 FRF (HT) |
| • University: 2000 FRF (HT) | • University: 2200 FRF (HT) |
| • Students: 800 FRF (HT) | • Students: 1000 FRF (HT) |

Registration form (enclosed) and payment should be forwarded as soon as possible to:
CPIC — Groupe ENSIC
"TRACER 2"
BP 451 — 1 rue Grandville — France — 54001 NANCY Cedex

➔ **Location of the meeting:**

A registration desk will be open on Tuesday, 29th May, from 9.00 a.m. to 3.00 p.m. in the main hall of the Palais des Congrès. During the meeting, a registration-information desk will be available in the same hall. A message board will be located in this hall. Telephone number of the meeting: 33 (0)3 83 36 81 81.

➔ **Proceedings**

Each registered participant will receive a bound copy of the proceedings. After the meeting, additional copies will be available from: CPIC — Groupe ENSIC (see address above).

➔ **Accommodation**

As the number of hotel rooms is limited in nancy, and many people will be visiting exhibitions, please return the enclosed hotel reservation form as soon as possible to the Palais des Congrès.

➔ **Transportation**

Nancy can be easily reached by train from Paris (3 h), Strasbourg (1h30), Karlsruhe (2h30) or Luxembourg (1h30). The closed airport is Metz-Nancy-Lorraine (near Pont-à-Mousson, between Nancy and Metz). Luxembourg is also a convenient airport (local buses or Luxair bus shuttles to Luxembourg train station).

The Palais des Congrès is quite close to the station (5 min walk; see enclosed map). There are public car parks situated nearby (equipped with slot-machines for payment).

➔ **Tee and coffee breaks:**

Coffee and tea will be provided during the breaks between the sessions.

➔ **Lunches:**

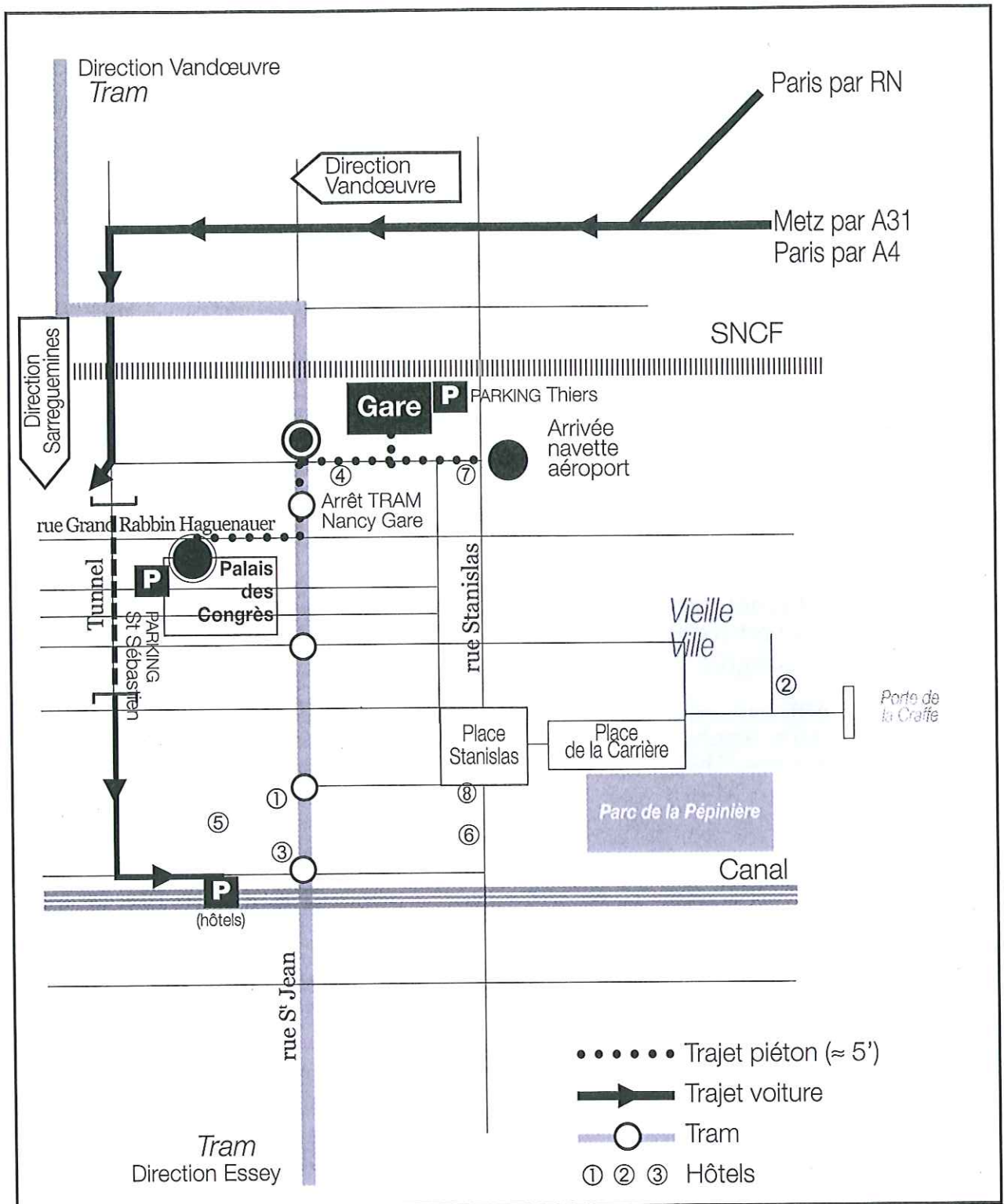
Lunches will be served on Tuesday, Wednesday and Thursday at the Palais des Congrès (Salle Majorelle); they are included in the registration fees. Lunch tickets will be available at the registration desk for accompanying guests (before 10.00 a.m. each day).

➤ **Social events:**

Information about activities and social events in Nancy will be available at the registration-information desk.

➤ **Poster sessions:**

The posters will be exposed for the entire duration of the congress.



TRACER 2

29 - 31 May 2001 — Nancy (France)

REGISTRATION

Mrs Ms Mr

Family Name:

First Name:

Affiliation:

Service/Laboratory:

Address:

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.....

Phone.: Fax:

Email:

• **Simple** inscription

- Industrials HT* 2500 FF
- University HT* 2000 FF
- Students HT* 800 FF

* **TVA** for French

Participants: +19.6% _____

TOTAL

• Inscription **including** gala night dinner and boat trip (May, 30th)

- Industrials HT* 2700 FF
- University HT* 2200 FF
- Students HT* 1000 FF

TOTAL

- For French Participants:** reduction coupons for SNCF travel are available.
- Special needs: vegetarian... ..
- Accompanying guest

- Payment:**
- CHEQUE (in French Francs) is enclosed
 - Bank transfer: please make drafts payable to:
CPIC - Riban account here under. *Bank charges are the responsibility of the payee and should be paid at source in addition to the registration fees.*
 - A duly authorized order form is enclosed.

Bank: BANQUE POPULAIRE DE LORRAINE
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IBAN: FR76 1470 7000 2002 0190 2715 601 Code **SWIST:** BPL/MSRMM





CPIC – Groupe ENSIC

"TRACER 2"

BP 451

54001 NANCY Cedex

TRACER 2

29 - 31 May 2001 — Nancy (France)

HOTEL RESERVATION FORM

Please fill in block letters.

Family Name:

First Name:

Affiliation:

Address:

.....

.....

Zip Code City Country

Phone: Fax:

Email:

ACCOMODATION

The following prices, per room, per night, breakfast not included, are indicative. They correspond to the minimum/maximum prices per category.

Category (check your choice)	3 ***	2 **	Tourism
<input type="checkbox"/> Single room	510/565 FF	365/410 FF	195/250 FF
<input type="checkbox"/> Double room <input type="checkbox"/> 2 beds <input type="checkbox"/> Large bed	550/615 FF	365/410 FF	195/250 FF

Please, reserve room(s) from evening to morning

Arrival date Hour / Departure date Hour

A deposit is due upon reservation: 450 FF per room (3***), 350 FF per room (2**) and 195 FF per room (tourism category). Refund of the advanced deposit will be made if cancellation (by fax or by mail) is received before: **May 22nd, 2001.**

TOTAL hotel deposit: FF

Registration form to be returned before **28/04/2001**, together with payment

By check in French Francs to "Lorraine Congrès"

By Credit Card - VISA, EUROCARD, MASTERCARD only

Name of cardholder :

Nb |_|_|_|_| |_|_|_|_| |_|_|_|_| |_|_|_|_| Expiry Date |_|_| |_|_|

in date Signature:

to send to: **PALAIS DES CONGRES** — BP 663 — France - 54063 NANCY CEDEX

TEL: (33) (0)3.83.36.81.81 FAX: (33) (0)3.83.36.81.80

e-mail: Maggy.Aulon@palais-congres-nancy.com

No reservation will be done after **April 28th, 2001**

✂ No reservation will be done **without deposit.**

PROGRAMME

Tuesday 29 May

- 8h00-9h30 **Registration**
- 9h30-10h00 **Opening session**
- 10h00-10h40 **Plenary lecture**
"Tracer experiments - a way to validate computational fluid dynamic simulations in an agitated vessel", by G. DELAPLACE, J.C. LEULIET, LGPTA-INRA, Villeneuve d'Ascq, Cl. TORREZ and Ch. ANDRÉ, LGP-HEI, Lille
- 10h40-11h10 **Coffee break**
- 11h10-11h30 **Oral communication**
"Determination of orifice gas flow in a model interconnected gas-solid fluidised-beds system using ^{81m}Kr as radiotracer", by Z.I. KOLAR, C.S. STELLEMA, M.N. BOERS, A.W. GERRITSEN, C.M. VAN DEN BLEEK, Delft Univ. of Technology, Delft, The Netherlands and R. DEKKERS, Amersham-Cygne, Eindhoven, The Netherlands
- 11h30-12h00 **Oral communication**
"A new technique for the determination of contact time distribution (CTD) from tracers experiments in heterogeneous reactors", M. MAGOS, M. TAYAKOUT-FAYOLLE and C. JALLUT, LAGEP-UCL, Villeurbanne
- 12h00-12h20 **Oral communication**
"Influence of the residence time distribution knowledge on gas-liquid mass transfer coefficient estimation", by M. FORISSIER, M. MITROVIC, I. PITAULT and D. RONZE, LGPC-ESCPE, Villeurbanne
- 12h20-14h00 **Lunch**

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- 14h00-15h20 **Poster session**
- 15h20-16h00 **Plenary lecture**
“Reactive tracing methods in natural porous media”, by M. SARDIN and M.O. SIMONNOT, LSGC-ENSIC-INPL, Nancy
- 16h00-16h40 **Plenary lecture**
“Interwell tracer technology in oil reservoirs: state-of-the-art”, by T. BJØRNSTAD, C. GALDIGA, J. SAGEN and Ø. DUGSTAD, Institute for Energy Technology, Norway
- 16h40-17h00 **Oral communication**
“Investigation of heavy metal evaporation in a pilot plant scale municipal solid waste incinerator by radiotracers”, by T. JENTSCH, IZFP, Dresden, Germany, S. BIOLLAZ, PSI, Villigen, Switzerland, M. DAVIDOVIC, CUTEK, Clausthal-Zellerfeld, Germany and M. BECKMANN, Institut für Verfahren und Umwelt, Weimar, Germany
- 17h00-17h20 **Oral communication**
“Bacteria and virus movement in unsaturated flow through sand filter”, by B. SELAS, A. LAKEL, CSTB, Nantes, Y. ANDRES and P. LE CLOIREC, EMN, Nantes

Wednesday 30 May

- 8h30-9h10 **Plenary lecture**
“An attempt at dual-ring SPECT tomography on a packed column”, by Ph. BERNE, V. BLET, S. LEGOUPIL, F. NARP and Ph. BANDELIER, CEA, Grenoble
- 9h10-9h30 **Oral communication**
“The usage of Sm-153 as a single particle radiotracer to measure radial circulation time in a stirred scale-model reactor”, by G. VAN KRANENBURG, S. MUTSERS and J. KONINGS, DSM Research, Geleen, The Netherlands
- 9h30-9h50 **Oral communication**
“(Numerical) particle tracking and visualization of dean vortices”, by R. MOLL, F. CHARBIT, P. MOULIN, LEAPS-ENSSPICAM, Marseille and D. VEYRET, IUSTI, Marseille
- 9h50-10h10 **Oral communication**
“Variation of the feed location and impeller speed in a stirred tank using planar laser induced fluorescence (P.L.I.F.)”, by A. FALL, O. LECOQ and R. DAVID, EMAC, Albi
- 10h10-10h40 **Coffee break**
- 10h40-11h00 **Oral communication**
“Flow characterisation in a CFB-riser and cyclone dipleg by electric capacitance tomograph”, by K. SMOLDERS, Institute for Environmental Sciences, Antwerp, Belgium and J. BAEYENS, UCL, Heverlee, Belgium
- 11h00-11h20 **Oral communication**
“Development of a monitoring and diagnostic device for extrusion processes based on the concept of local and overall residence time distributions”, by G.H. HU, LSGC-CNRS-ENSIC-INPL, Nancy
- 11h20-11h40 **Oral communication**
“Experimental effect of flow and particle size on particle RTD in a continuous powder mixer”, by K. MARIKH, H. BERTHIAUX, EMAC, Albi and V. MIZONOV, Ivanovo State power Eng. University, Ivanovo, Russia

- 11h40-12h00 **Oral communication**
"Z-transform and adaptive signal processing in analysis of tracer data", by L. FURMAN, University of Mining and Metallurgy, Krakow, Poland
- 12h00-14h00 **Lunch**
- 14h00-16h00 **Poster session**
- 16h00-16h20 **Oral communication**
"Research and development in radiotracer methodology and technology", by J. THERESKA, Int. Atomic Energy Agency, Vienna, Austria
- 16h20-16h40 **Oral communication**
"Study of fluidynamics of leaching vats at South Mine, Chuquicamata Division, Codelco Chile", by Ch. MORENO, N. HERESI, R. FUENTES, Instituto de Innovacion en Minería y Metalurgia, Santiago, Chile and I. CARRERA, Subgerencia Mina Sur y Oxidos, Chuquicamata, Chile
- 16h40-17h00 **Oral communication**
"Measurement of slip velocity during hydrotransport through vertical pipes", by L. PETRYKA, R. KEBLOWSKI, University of Mining and Metallurgy, Krakow, Poland, X. GAO, China Institute of Atomic Energy, Beijing, China and K. RADEK MURZYN, Centre for Research and Dev. of Isotopes and Radiation Technology, Jakarta, Indonesia
- 17h00-17h20 **Oral communication**
"Suspended sediment behaviour in irrigation canals of Pakistan. Study with radioactivable and fluorescent tracers", by A. VABRE and P. BRISSET, CEA-DAMRI, Gif-sur-Yvette
- 17h20-17h40 **Oral communication**
"Gradient of water steam pressure and transfers of tritiated humidity through unsaturated concretes CPA 55 confinement (cement with water/cement = 0.30; 0.40; 0.65)", by G. BEAUDOING and D. MOURZAGH, CEA, S.A.T., Grenoble

Thursday 31 May

- 8h30-9h10 **Plenary lecture**
“Probing of multiphase opaque flows by radioactive techniques”,
by M.P. DUDUKOVIC, CREL-Washington University, Saint-Louis,
USA and B.A. TOSELAND, AIR PRODUCTS and CHEMICALS,
Allentown, USA
- 9h10-9h30 **Oral communication**
“Tracer dynamic study in a bubble column”, by M. RAFIQUE,
M. AL-DAHMAN and M.P. DUDUKOVIC, Washington University,
Saint-Louis, USA
- 9h30-9h50 **Oral communication**
“Validation of a Lagrangian trajectory calculation algorithm by
comparison with an experimental residence time distribution”, by
J. PRUVOST, J. LEGRAND and P. LEGENTILHOMME, LGEPEA,
Université de Nantes, Saint-Nazaire
- 9h50-10h10 **Oral communication**
“Hydrodynamic diagnosis of a shell-and-tube heat exchanger using
tracers. Comparison of global and local approaches”, by M. ALBARIC,
P. BANDELIER, GRETh-CEA, Grenoble and C. JALLUT,
LAGEP-ESCPE, Villeurbanne
- 10h10-10h40 **Coffee break**
- 10h40-11h10 **Oral communication**
“Using PEPT to study the flow pattern of a 22 litre draft tube
crystalliser”, by M.D. DE JONG, Rotterdam, The Netherlands, G.S.M.
VAN BEUZEKOM, Z.I. KOLAR, H.J.M. KRAMER and B. SCARLETT,
Delft University of Technology, Delft, The Netherlands

- 11h10-11h30 **Oral communication**
“Multidimensional simulation of air flows in a ventilated room
Application to calculating Residence Time Distribution”, by
L. RICCIARDI and J.C. LABORDE, DPEA-IPSN-CEA, Gif-sur-Yvette
- 11h30-11h50 **Oral communication**
“RTD: a necessary step to define systemic models from CF
information. Application on ozonation industrial tanks for drinking
water treatment”, by C. DE TRAVERSAY, F. LUCK, ANJ
RECHERCHE-VIVENDI WATER, Maisons-Lafitte, D. WOLBEI
and A. LAPLANCHE, ENSCR, Rennes
- 11h50-12h30 **Conclusion**
- 12h30-14h00 **Lunch**

POSTERS

A • Fundamental development

A1 • Tomography, tracer camera visualization and particles tracking

- “Parallel flow asymmetries due to natural convection investigated by tracer technique”, by R. ZITNY and J. THYN, CTU Prague Faculty of Mechanical Engineering, Praha, Tchechoslovaquia
- “Exploration by laser tomography of the active zone of an ultrasonic reactor at high frequency”, by E. VALETTE, Y. GONTHIER and E. GONZE, LGP-ESIGEC, Le Bourget du Lac
- “CARPT dynamic bias studies. Evaluation of accuracy of position and velocity measurements”, by A.R. RAMMOHAN, A. KEMOUN, M.P. DUDUKOVIC, CREL-Washington University, Saint-Louis, USA, and F. LARACHI, University Laval, Sainte-Foy, Canada
- “On-line study of two powders mixture by image processing”, by A.L. LE COËNT, A. RIVOIRE, M. TAYAKOUT, S. BRIANCON and J. LIETO, LAGEC-ESCEP, Villeurbanne

A • Fundamental development

A2 • Validation of computational fluid dynamics simulations by tracer experiments and numerical Residence Time Distribution

- “Air flow distribution in ventilated room: RTD model synthesis based on simulated annealing and CFD”, by P. FLOQUET, C. LAQUERBE, L. PIBOULEAU, S. DOMENECH, LGC-ENSIGC, Toulouse, J.C. LABORDE and S. SOARES, DPEA-IPSN-CEA, Gif-sur-Yvette
- “Application of RTD and CFD for flue gas irradiation reactor investigation”, by A.G. CHMIELEWSKI, J. PALIGE, A. DOBROWOLSKI, A. OWCZARCZYK, Institute of Nuclear Chemistry and Technology, Warsaw, Poland, and A. ROZEN, Warsaw Technical University, Warsaw, Poland
- “Visualization and numerical simulation of current's structures in front of the water intakes of the Laroussia dam”, by Z. HAFSIA and K. MAALEL, LHEM-ENIT, Tunis, Tunisia

A • Fundamental development

A3 • New tracers and detectors or improvement and development of existing tracing methods

- “Simulation of membrane gas sensor”, by H. ZHANG, A. MENDES, F.D. MAGALHAES, LEPAE-University of Porto, Porto, Portugal
- “Fluorescent photolabile protecting groups of interest in DNA arrays”, by C. MULLER, M.L. VIRIOT and M.C. CARRE, DCPR-CNRS-ENSIC-INPL, Nancy
- “Ultra trace detection of perfluorocarbons in petroleum reservoir gas matrices by thermal desorption in combination with GC/NICI-MS”, by C.U. GALDIGA, S.K. HARTVIG, T. BJØRNSTAD, Institute for Energy Technology, Norway, and T. GREIBROKK, Univ. of Oslo, Dpt of Chemistry, Oslo, Norway

“Study of the gas hydrodynamics in an annular reactor”, by G. GENIN, E. SCHAEER, L. FALK, J.L. HOUZELOT and C. FAVRE, LSGC-CNRS-ENSIC-INPL, Nancy

A • Fundamental development

A4 • Data treatments and modeling

- “Characterization of an electrochemical industrial size filterpress reactor by hydrodynamic and mass transport studies”, by A. FRIAS-FERRER, J. GONZALEZ-GARCIA, J.A. CONESA, E. GADEA-RAMOS, E. EXPOSITO, V. GARCIA-GARCIA, V. MONTIEL and A. ALDAZ, Universidad de Alicante, Spain
- “Application of statistical methods to determination of RTD in flow processes”, by L. PETRYKA, University of Mining & Metallurgy, Krakow, Poland
- “Using solutes as tracers for the characterization of a liquid-liquid separation process: the centrifugal partition chromatograph”, by L. MARCHAL, J. LEGRAND, GEPEA-CRTT, Saint-Nazaire and A.P. FOUCAULT, IFREMER, Nantes
- “Incorporation of tracer test information into the control loop design of a continuous flow process”, by A.J. NIEMI, K. ZENGER, Helsinki University of Technology, Finland and P. VIITANEN, TELLABS OY, Helsinki, Finland
- “Correcting the results of radioactive tracer experiments for the effect of the detection chain”, by Ph. BERNE and V. BLET, CEA-DAMRI, Grenoble
- “Application of the possibility theory to the automatic generation of compartment models”, by S. CLAUDEL, C. FONTEIX, J.P. LECLERC and H.G. LINTZ, LSGC-CNRS-ENSIC-INPL, Nancy
- “Hydrodynamic diagnosis of heat exchangers using tracers and a global model”, by M. ALBARIC, P. BANDELIER, CEA-GRETH, Grenoble and C. JALLUT, LAGEP-ESPCE, Villeurbanne
- “Fitting data when no physical model is available”, by J.R. NUNHEZ, C.B. COSTA and R. GUIRARDELLO, Faculdade de Engenharia Quimica, Campinas, Brazil

B • Industrial applications

B1 • Geology, hydrogeology and oil field applications

- “Application of bip tests employing natural and artificial tracers in waterflooded oil fields of Neuquina basin (Argentina)”, by C. SOMARUGA, Comahue University, Neuquen, Argentina and C. GAZZERA, PEREZ Compans SA, Neuquen, Argentina
- “Measurement of infiltration velocity in aquifers with fluorescent tracers: improved methodology”, by Ph. BERNE, V. BLET, P. BURGHOFFER, O. GERBAUX and D. GETTO, CEA-DAMRI, Grenoble
- “Radio-tracer studies on statoil sliepner platform”, by S. COLIN, SYNETIX, Ilb, UK
- “Enhanced oil production by massive gas injection studied with radiotracer technique”, by A. HAUGAN, B. CVETKOVIC, T. BJØRNSTAD, J. MÜLLER and Ø. DUGSTAD, Institute for Energy Technology, Norway

B • Industrial applications

B2 • Civil engineering, mineral engineering and metallurgy applications

- “Tracing of surface treatment reactors”, by F. KOP and R. NICOLLE, IRSID, Maizières-les-Metz
- “Modeling of the copper ore concentration processes based on the experimental RTD functions”, by Z. STEGOWSKI, University of Mining and Metallurgy, Krakow, Poland

B • Industrial applications

B3 • Chemical engineering

- “Hydrodynamics and mass transfer in a mechanically agitated high pressure reactor”, by N. MEDEIROS DE LIMA FILHO, E. BEZERRA DE MORAES MEDEIROS, UFPE, Recife, Brazil, D. RONZE and A. ZOULALIAN, ENSTIB, Vandœuvre-les-Nancy
- “Modeling an electrochemical reactor by use of residence time distribution”, by H. CHIFFLET, C. EYSSERIC, CEA, Marcoule and J.P. CAIRE, LEPMI-ENSEEG, Saint-Martin-d’Hères
- “Radioisotope tracer study in a pilot-scale trickle bed reactor”, by H.J. PANT, Bhabha Atomic Research Centre, Mumbai, India and Ph. BERNE, CEA-DAMRI, Grenoble
- “Simple tracing method used to characterise a packing effect on hydrodynamic of bubble columns”, by G. HEBRARD, S. MOUSTIRI and M. ROUSTAN, LIPE-GPI-INSA, Toulouse
- “Salt tracer used in loop multiphase reactors”, by A. COUVERT, S. SIMON, D. BASTOUL, M. ROUSTAN, LIPE-GPI-INSA, Toulouse and P. CHATELLIER, CIRSEE-Lyonnaise des Eaux, Le Pecq
- “Carbon dioxide dynamic analysis in γ -Al₂O₃ fixed bed”, by J.E.F. MORAES, S. LUCENA and C.A.M. ABREU, Federal University of Pernambuco, Recife, Brazil
- “Radio-tracer studies of an ebullated bed reactor”, by J.M. SCHWEITZER and S. KRESSMANN, IFP-CEDI, Vernaison
- “Tracer response RTD-measurements in spiral-wound RO-membranes”, by J. DEGRÈVE, J. VAN GAUWBERGEN and J. BAEYENS, Katholieke Universiteit Leuven, Leuven, Belgium
- “Validation of integrated CFD and precipitation model”, by A. BORISSOVA, University of Leeds, Leeds, UK

B • Industrial applications

B4 • Environment

- “Hydrodynamic behaviour of gas and liquid flows in a gas-liquid column. Applications to deodorization of waste gases”, by Ph. HUMEAU, J.N. BALÉO, P. PRÉ, P. LE CLOIREC, DSEE-EMN, Nantes, F. RAYNAUD and J. BOURCIER, VERITE SA, Boufféré
- “Hydrodynamics in a aerated channel reactor: influence of air and gas flow rates on axial dispersion”, by O. POTIER, S. PONCIN, M.N. PONS, J.P. LECLERC, C. GENTRIC and E. RENO, LSGC-CNRS-ENSIC-INPL, Nancy
- “Use of the indium 113 in the laboratory to improve our knowledge on the behavior of the discharges of muddy dredged material”, by R. BOUTIN, Sce Techn. des Travaux Immobiliers et Maritimes, Paris-Armées and P. BRISSET, CEA-DAMRI, Gif-sur-Yvette
- “Sedimentation basin investigation using radiotracers”, by A.G. CHMIELEWSKI, A. OWCZARCZYK and J. PALIGE, Institute of Nuclear Chemistry and Technology, Warsaw, Poland
- “Assessment of sulphur emission at Norcem’s cement kiln by use of ^{35}S -tracer”, by D.O. ERIKSEN, V. MARTINI, Institute for Energy Technology, Kjeller, Norway and L.A. TOKHEIM, NORCEM SA, Brevik, Norway
- “Use of the TC-99M in studies of treatment of industrial waste in petrobras”, by A. DAMERA MARTINEZ, K. ADELA RAMOS, Centro de Atencion a la Actividad Nuclear, Ciudad de Camaguey, Cuba, A. FERREIRA PINTO, Centro de Desenvolvimento de Tecnologia Nuclear, Minas Gerais, Brazil and M. DERIVET ZARZABAL, Instituto Cubano de Investigaciones Azucarera, La Havana, Cuba
- “Use the tracer radioactive in the station of treatment of residual in the oil industry”, by A. DAMERA MARTINEZ, K. ADELA RAMOS, Centro de Atencion a la Actividad Nuclear, Ciudad de Camaguey, Cuba, A. FERREIRA PINTO, Centro de Desenvolvimento de Tecnologia Nuclear, Minas Gerais, Brazil and M. DERIVET ZARZABAL, Instituto Cubano de Investigaciones Azucarera, La Havana, Cuba
- “Evaluation of a residual waters treatment pilot plant using $^{99\text{m}}\text{Tc}$ as radiotracer in the city of Itabira, MG Belo Horizonte, by M. DERIVET ZARZABAL, ICINAZ, Habana, Cuba, A.M. FERREIRA PINTO, CDTN, Minas Gerais, Brazil and A. DAMERA MARTINEZ, CAAN, Ciudad de Camaguey, Cuba
- “Simulation of air flow distributions in rooms by the systemic approach”, by S. SOARES, J.C. LABORDE, SERAC-IPSN-CEA, Gif-sur-Yvette, S. DOMENECH, and P. FLOQUET, LGC-ENSIGC, Toulouse
- “Tracer methods applied to on-site wastewater treatment facilities”, by A. BENNACHERA and C. BECK, ENGEES, Strasbourg

B • Industrial applications

B5 • Food engineering and Bio-engineering

“Study of the sugar ingot flow-patterns in the Notre-Dame refinery silo in Oreye”, by J.P. PIRARD, N. JOB, Université de Liège, Liège, Belgium and A. DARDENNE, Raffinerie Tirlemontoise SA, Tienen, Belgium

“Identification by fluorescent tracers of the high risk products in the meat and bone meal industry”, by J.P. CHANET, M. BERDUCAT, CEMAGREF, Aubière, J.P. FRENCIA, ADIV, Clermont-Ferrand and G. BEAUDOING, CEA-DAMRI, Grenoble

“A biochemical tracer detection to quantify the intensity of thermal processing and to optimise food quality”, by S.C. ELIOT-GODERÉAUX, A. GOULLIEUX and M. QUENEUDEC t’KINT, LTRMC-IUT, Amiens

“Assessment of the bioavailability of heavy metals in soils using isotopic exchange kinetics methods”, by G. ECHEVARRIA, E. GERARD, S. SHALLARI, C. SCHWARTZ and J.L. MOREL, LSE-ENSAIA-INRA, Vandœuvre-les-Nancy

“Formulation of flow model in low grade massecuite fluids in sugar crystallization process”, by M.J. GRIFFITH, ICINAZ, Habana, Cuba

Scientific Committee

Baluais Gérard (Péchiney, Voreppe, France)
Blet Vincent (CEA-DAMRI, Grenoble, France)
Bossoutrot Jean-Michel (Atofina, Pierre-Bénite, France)
Charlton Stuart J. (ICI Syntex Tracerco, Kuala Lumpur, Malaysia)
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