PROGRAM

Sunday, June 5, 2022

15:00 - 17:00  Registration (tea and coffee available)

17:00 - 17:30  Welcome and Opening Address

SESSION 1: INTRODUCTION
Chair: Dr. Hans Zettler

17:30 - 18:00  Talk by Prof. Luis Melo
LEPABE-Laboratory for Process Engineering, Environment, Biotechnology and Energy, Department of Chemical Engineering, Faculty of Engineering, University of Porto, Porto, Portugal

18:00 - 18:30  Crude oil fouling – field experience
Himanshu Joshi
ALPH Heat Transfer, 398 North Rd., Chester NJ 07930 USA

18:30 - 19:00  Generation of experimental data for model training to optimize fouling prediction
N. Jarmatz, W. Augustin and S. Scholl
Technische Universität Braunschweig, Institute for Chemical and Thermal Process Engineering, Langer Kamp 7, 38106 Braunschweig, Germany

19:30 - 20:30  Dinner (followed by Social Hour)

Monday, June 6, 2022

7:00 - 9:00  Breakfast

SESSION 2: FOULING IN HYDROCARBON SYSTEMS (PART 1)
Chair: Dr.-Ing. Les Jackowski

9:00 - 9:30  Economic and environmental implications of fouling in crude preheat trains
E. M. Ishiyama, S. J. Pugh and H. U. Zettler
HTRI, 40 Occam Road, Guildford, Surrey, GU2 7YG

9:30 - 10:00  Impact of fouling on thermo-hydraulics of viscous coolers
E. M. Ishiyama¹ and D. I. Wilson²
¹HTRI, 40 Occam Road, Guildford, Surrey, GU2 7YG
²Department of Chemical Engineering and Biotechnology, University of Cambridge, Cambridge, CB3 0AS, UK

10:00 - 10:30  Ethylene plant cracked gas compressor fouling mitigation
Bhaskar Reddy Aluri
SABIC Technology Centre, Jubail 31961, Saudi Arabia
SESSION 3: FOULING IN HYDROCARBON SYSTEMS (PART 2)
Chair: Dr. Aaron Smith

11:00 - 11:30 Comparison of heat exchanger fouling test results for once-through and recirculating modes of operation at constant flowrate
F. Cibotti, E. Rogel, E. Forbes and L. Jackowski
Chevron Technical Center, Richmond, CA, USA

11:30 - 12:00 Characterizing fouling tendency of crude oil on a surface using a High Temperature Variable Shear coupon test rig
P. Singh¹, S. Krishnaswamy², K. Ponnani³, A. Verma³ and J. Rawat³
¹Centre of Excellence in Process Engineering & Intensification (COE-PE&I), Department of Chemical Engineering, BITS-Pilani K K Birla Goa Campus, Goa, India
²15/151 (old 7/383) Sreenivas, Sivan Kovil Street, Tharakkad, Palakkad, Kerala-678001, India
³Bharat Petroleum Corporation Limited, Corporate R & D Center, Greater Noida, India

12:00 - 12:30 Incorporation of fouling deposit measurements in crude oil fouling testing and data analysis
A. Smith and E. Hitimana
HTRI, P.O. Box 1390, Navasota, Texas 77868, USA

12:00 - 13:00 Enhancement of refinery profitability via increasing the life-cycle of welded plate heat exchanger in the sour water stripping Process
Ali Bani Kananeh¹, Bennat Drazner², Arne Hannig¹ and Grant Firth³ and Rosa Gilsanz⁴
¹Kelvion PHE, Karl-Schiller-Str. 1-3, D-31157 Sarstedt, Germany, ali.bani-kananeh@kelvion.com
²Kelvion Inc - Thermal Engineered Solutions, 5202 West Channel Road, Catoosa, OK 74015, USA
³Firth Engineering, Moststr. 10, D-93326 Abensberg, Germany
⁴BAYERNOL Raffineriegesellschaft GmbH, Raffineriestraße 100, D-93333 Neustadt, Germany

13:00 - 14:00 Lunch

14:00 - 14:30 Determining the fouling tendency of different feedstocks in the Fouling Assessment Setup (FAST)
L. dos S. Vargette, N. Ristic, M. Geerts, G.J. Heynderickx and K.M. Van Geem
Laboratory for Chemical Technology, Technologiepark 121, 9052 Zwijnaarde, Belgium

SESSION 4: POSTER SESSION
Chair: Prof. Luis Melo

14:30 - 17:00 Poster session
Tuesday, June 7, 2022

7:00 - 9:00
Breakfast

SESSION 5: FOULING IN FOOD PROCESSING
Chair: Guillaume Delaplace

9:00 - 9:30
Diffusive mass transfer in cleaning of a jellylike whey protein fouling layer
H. Wiese, H. Geißler, W. Augustin and S. Scholl
Technische Universität Braunschweig, Institute for Chemical and Thermal Process Engineering, Langer Kamp 7, 38106 Braunschweig, Germany

9:30 - 10:00
Ultrasonic coda wave interferometry (CWI) for detecting a change at interface of a solid surface - Applications for monitoring fouling, biofilm growth, cleaning and corrosion
G. Delaplace1, P. Campistron2, M. Abdallah1, A. Bouteignon1, T. Daniel1, S. Khelissa1, T. Six1, L. Wauquier1, T. Dubois1, N-E. Chihib1, P. Debreyne1, C. Nicard1, I. Proriol Serre1, D. Balloy, B. Chen1,2, M. Farin2, O. Brehault2, D. Callens3, L. Chehami1, F. Benmeddour2 and E. Moulin2
1Univ. Lille, CNRS, INRAE, Centrale Lille, UMR 8207—UMET—Unité Matériaux Et Transformations, France
2Univ. Lille, CNRS, Centrale Lille, Junia, Univ. Polytechnique Hauts-de-France, UMR 8520 - IEMN - Institut d’Electronique de Microélectronique et de Nanotechnologie, France

10:00 - 10:30
Influence of the rheological properties and pull-off forces of native and modified starches on cleaning in plane channel flow
S. Kricke1, C. Berger2, S. Zahn2, H. Köhler1, H. Rohm2 and J.-P. Majschak1
1Chair of Processing Machines/Processing Technology, Institute of Natural Materials Technology, Technische Universität Dresden, Germany
2Chair of Food Engineering, Institute of Natural Materials Technology, Technische Universität Dresden, Germany

10:30 - 11:00
Break

11:00 - 11:30
Role of casein micelle on the whey protein fouling in a bench-scale fouling device
W. Liu1,2,5, X. D. Chen1,5, R. Jeantet3,5, C. André4, and G. Delaplace1,5
1School of Chemical and Environmental Engineering, Soochow University, Suzhou, Jiangsu, P.R. China, 215123
2Univ.Lille, CNRS, INRAE, Centrale Lille, UMR 8207-UMET-Unite Materiaux et Transformations, F-59000, Lille, France
3STLO, INRAE, Institut Agro, 35042, Rennes, France
4HEI (Ecole des Hautes Etudes d’Ingénieur), Département Chimie, Textiles et Process Innovants, 13, rue de Toul, 59046 Lille Cedex, France
5International Joint Laboratory (INRAE Villeneuve d’Ascq – Soochow University-Agrocampus Rennes), School of Chemical and Environmental Engineering, College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Suzhou, Jiangsu Province 215123, China
System for automated monitoring of local soil removal during cleaning in closed food processing lines with a quartz crystal sensor
S. Gottschall, R. Murcek, S. Städtler and M. Mauermann
Fraunhofer IVV, Division Processing Technology

**SESSION 6: BIOFOULING**
Chair: Prof. Luis Melo

12:00 - 12:30 Flowing Foam: An eco-efficient strategy for cleaning of contaminated industrial equipment
H. Dallagi¹, C. Faille¹, L. Bouvier¹, L. Wauquier¹, C. Gruescu¹, F. Aloui² and T. Bénézech¹
¹ Univ.Lille, CNRS, INRAE, Centrale Lille, UMR 8207-UMET-Unite Materiaux et Transformations, F-59000, Lille, France
² LAMIH UMR CNRS 8201, Polytechnic University of Hauts-de-France (UPHF)
Department of Mechanics, Campus Le Mont Houy 59313 Valenciennes Cedex 9 – France

13:00 - 14:00 Lunch
14:15 Conference Excursion including Dinner

**Wednesday, June 8, 2022**

7:00 - 9:00 Breakfast

**SESSION 7: FOULING MITIGATION**
Chair: Aaron Smith

9:00 - 9:30 Software-guided clamp-on power ultrasound solution for fouling mitigation in tubular heat exchangers
P. Moilanen, T. Rauhala, S. Ahmadzai
Altum Technologies, Helsinki, Finland

9:30 - 10:00 Interaction of heat transfer enhancement and fouling in operating heat exchangers
E. M. Ishiyama¹, S. J. Pugh¹ and A. P. Watkinson²
¹ Heat Transfer Research Inc., The Surrey Technology Centre, 40 Occam Road, Guildford, Surrey GU2 7YG, UK
² Department of Chemical and Biological Engineering, University of British Columbia, Vancouver, BC, Canada V6T 1Z3

10:00 - 10:30 Using Continuous Helical Flow Electric Heat Exchangers to Reduce Fouling
D. P. Long, J. Wilson
Society of Petroleum Engineers (SPE), Watlow Electric Manufacturing Company, 6 Industrial Loop Road, Hannibal, MO, USA 63401

10:30 - 11:00 Break
SESSION 8: CFD MODELLING
Chair: Dr.-Ing. Heike Glade

11:00 - 11:30  CFD-based Modelling of a Cohesively Separating Soil Layer in consideration of local soil distribution
C. Golla¹, H. Köhler² and F. Rüdiger¹
¹Institute of Fluid Mechanics, Technische Universität Dresden, Germany
²Institute of Natural Materials Technology, Technische Universität Dresden, Germany

11:30 - 12:00  Optimization of macro-structured pipe surfaces to improve the cleaning performance
T. Hanisch, M. Joppa, V. Eisenrauch, S. Jacob and M. Mauermann
Fraunhofer Institute for Process Engineering and Packaging IVV, Dresden, Germany

12:00 - 12:30  Maldistribution in shell-and-tube heat exchangers and its effect on fouling and performance
R. Schab, A. Kutschabsky, S. Unz and M. Beckmann
Technische Universität Dresden, Dresden, Germany

12:30 - 13:00  CFD modelling of an initial powdery layer on cooled tubular surfaces
J. Strouhal, T. Juféna, Z. Jegla
Brno University of Technology, Institute of Process Engineering, Technická 2, 61669 Brno, Czech Republic

13:00 - 14:00  Lunch

SESSION 9: CRYSTALLIZATION FOULING
Chair: Dr.-Ing. Augustin Wolfgang

14:00 - 14:30  The potential of thermally conductive polymer composites regarding crystallization fouling mitigation
H. Kiepfer¹, H.-J. Bart¹, P. Stannek², M. Kuypers², M. Grundler²
¹Laboratory of Reaction and Fluid Process Engineering, TU Kaiserslautern, 67663 Kaiserslautern, Germany
²Zentrum für BrennstoffzellenTechnik, 47057 Duisburg, Germany

14:30 - 15:00  Crystallisation fouling from aqueous solutions of clathrate hydrates
A. Karela¹,², S.M. Clarke³,⁴, G. Kawaley⁴, A.F. Routh¹,³ and D.I. Wilson¹
¹Department of Chemical Engineering and Biotechnology, University of Cambridge, Cambridge, CB3 0AS, UK
²Department of Chemistry, University of Cambridge, Cambridge, CB2 1EW, UK
³Centre for Environmental and Industrial Flows, University of Cambridge, Cambridge, CB3 0EZ, UK
⁴Mitsubishi Electric R&D Centre Europe BV, 17 Firth Road, Houston Industrial Estate, Livingston, UK, EH54 5DJ
15:00 - 15:30  Investigations of crystallization fouling in columns  
K. Inderwies, H. Klein and S. Rehfeldt  
Technical University of Munich, TUM School of Engineering and Design, Department of Energy and Process Engineering, Institute of Plant and Process Technology, Garching/Germany

15:30 - 16:00  Break

16:00 - 16:30  Impact of a Surfactant on Film Flow and Crystallization Fouling in Falling Film Evaporators  
M. Waack¹, S. Nied² and H. Glade¹,  
¹University of Bremen, Engineering Thermodynamics, Badgasteiner Str. 1, 28359 Bremen, Germany  
²BASF SE, 67056 Ludwigshafen, Germany

16:30 - 17:00  Role of Zinc in Bulk Precipitation from Steaming Process of Potable Water  
A. Al-Gailani*¹ and R. Barker²  
¹Department of Chemical Engineering, University of Hull, Hull, HU6 7RX, England  
²School of Mechanical Engineering, University of Leeds, Leeds, LS2 9JT, England

19:30 - 22:30  Dinner (followed by Social Hour)

Thursday, June 9, 2022

7:00 - 9:00  Breakfast

SESSION 10: HEAT EXCHANGER NETWORKS AND DIGITAL TWIN TECHNOLOGIES  
Chair: Dr. Edward Ishiyama

9:00 - 9:30  HEATTRAX: A new approach to exchanger fouling management  
K. Vann¹, T. Matthews¹, N. Wang¹, B. Busker¹, M. Bagajewicz², D. Oliva³ and R. Vargas⁴  
¹Refined Technologies, Houston, TX, USA  
²OK-Solutions, Norman, OK, USA  
³INGAR, Santa Fe, Santa Fe, Argentina  
⁴UAP, Libertador General San Martin, Entre Rios, Argentina

9:30 - 10:00  Fouling thickness modeling for refinery cleaning schedule optimization  
M. J. Bagajewicz¹²³, A. L. M. Nahes⁴ and A. L. H. Costa⁵  
¹OK-Solutions, Norman OK, USA (corresponding author)  
²Refined Technologies, Houston, TX, USA  
³Federal University of Rio de Janeiro, Rio de Janeiro, Brazil.  
⁴State University of Rio de Janeiro, Rio de Janeiro, Brazil.

10:00 - 10:30  Fouling management through digital transformation  
E. M. Ishiyama, J. Kennedy, H. U. Zettler and S. J. Pugh  
Heat Transfer Research, Inc., 40 Occam Road, Guildford, Surrey, GU2 7YG, UK

10:30 - 11:00  Break
11:00 - 11:30  **TotalEnergies Fouling Management Program**
E. Gomez¹, L. France¹, E. M. Ishiyama², J. Kennedy² and S. J. Pugh²
¹TotalEnergies, Heat Transfer Research, Inc., 40 Occam Road, Guildford, Surrey, GU2 7YG, UK
²Heat Transfer Research, Inc., 40 Occam Road, Guildford, Surrey, GU2 7YG, UK

**SESSION 11: INDUSTRIAL CLEANING**
Chair: Simon Pugh

11:30 - 12:00  **Thermal heat exchanger cleaning**
R. Mol
Thermo-Clean Group, Dellestraat 45, B-3550 Heusden-Zolder

12:00 - 12:30  **Developments personal safety for Industrial Cleaning**
H. Borgt
Dow Benelux b.v., P.O. Box 48, 4530AA, Terneuzen, The Netherlands

12:30 - 13:00  **Simultaneous Effective Removal of Iron Polysulfide and Polyolefin Fouling from Twisted Tube Heat Exchangers in Hydrocracker Process using Ultrasonic Chemical Cleaning**
R. A. Shank¹ and T. R. McCartney²
¹136-26 Westlake Glen; Strathmore, AB; T1P 1X5, Canada
²2-321 37 Ave NE; Calgary, AB; T2E 6P6, Canada

13:00 - 14:00  **The economic impact of better heat exchanger cleaning on an oil refinery – theoretical, expected and actual results**
B.N. Kieser¹, R. Tomotaki², J. Loyola-Fuentes³, E. Diaz-Bejarano³ and F. Coletti³
¹TechSonic LP, 8703 - 98 Street, Morinville, Alberta Canada T8R 1K6,
²Clean As New, 1303 Thompson Park Drive, Baytown, Texas 77521 USA
³Hexxcell Ltd., Foundry Building, 77 Fulham Palace Road, London, UK W6 8AF

14:00 - 14:30  **Chemical Cleaning of Crude Oil Fouling Deposits; Applying the Coke Spectrum**
R. A. Shank¹ and T. R. McCartney²
¹136-26 Westlake Glen; Strathmore, AB; T1P 1X5, Canada
²2-321 37 Ave NE; Calgary, AB; T2E 6P6, Canada

14:30 - 15:00  **Multistage fouling fracturing method**
E. Cherednik¹ and A. Belomestnykh²
¹Angara Global, Plantagekade 58, 1018 ZV, Amsterdam, Netherlands
²Alnair Mineral Services DMCC, 1104, Reef Tower, Cluster O, Jumeirah Lakes Towers, Dubai, UAE, 5003335

15:00 - 15:30  **Break**

15:30 - 16:00  Break
SESSION 12: SURFACE MODIFICATIONS (PART 1)
Chair: Dr.-Ing. Les Jackowski

16:00 - 16:30 Accelerated Decarbonization Through In-Place Surface Treatment Technologies
V. Veedu¹, M. Nakatsuka², S. Thapa³
¹Oceanit, 8402 Scranton St, Houston, TX, 77061, United States
²Oceanit, 828 Fort Street Mall, Suite 600, Honolulu, HI, 96813, United States
³Oceanit, 8402 Scranton St, Houston, TX, 77061, United States

16:30 - 17:00 Reduce OPEX and CAPEX in refining process unit fired heaters and heat exchangers using tubacoat technology
S. Lodha
Tubacoat S.L., Parque Cientifico y Tecnologico de Bizkaia Ibaizabal Bidea, Edificio 702, 1ª planta, Derio, Bizkaia, 48160, Spain

19:30 - 20:30 Conference Banquet (followed by Social Hour)

Friday, June 10, 2022

7:00 - 9:00 Breakfast

SESSION 13: SURFACE MODIFICATIONS (PART 2)
Chair: Dr. Hans Zettler

9:00 - 9:30 Anti-fouling coatings: A critical review and development roadmap
Simone Mancin¹,² and Francesco Coletti²,³
¹University of Padova, Dept. Management and Engineering, Str.Ila S. Nicola 3
36100 Padova
²Brunel University London, Chemical Engineering Department, Uxbridge, UK
³Hexxcell Ltd, Foundry Building, 77 Fulham Palace Road, W6 8AF, London, UK

9:30 - 10:00 Investigation of icephobic coatings for supercooling heat exchangers under submerged conditions using ice detection equipment
Jens R. Frandsen¹, Ricardo Losada¹, Daniel Carbonell²
¹Danish Technological Institute, Kongsvang Allé 29, 8000 Aarhus C, Denmark
²SPF Institut für Solartechnik, OST Fachhochschule Ostschweiz, Oberseestrasse 10, 8640 Rapperswil-Jona, Switzerland

10:00 - 10:30 Butadiene chemical reaction fouling in Steam Cracker and butadiene unit, overview and control by surface modification
J.-P. Thoret-Bauchet¹, Lionel Renaud², Ludovic Galliot³
¹TotalEnergies One Tech Belgium, Zone Industrielle Feluy C, B-7181 Seneffe – Belgium
²TotalEnergies TRTG - Zone Industrielle du Port Autonome du Havre – 76700 – Harfleur – France
³TotalEnergies CSTJF - Avenue Larribau - 64018 - PAU - France

10:30 - 11:00 Break
SESSION 14: SURFACE MODIFICATIONS (PART 3)
Chair: Dr. Hans Zettler

11:00 - 11:30   Novel surface treatment to mitigate fouling in heat exchangers and process equipment
J. Ayutsede¹, S. Kerber², E. Curran³, B. Dooley⁴, I. Luna⁵, L. Jackowski⁵
¹Chevron Products Company, Richmond, CA, USA
²Material Interface Inc., N73W22301 Willow View Drive, Sussex, WI 53089 USA
³Curran International, 4610 Vicksburg St, Dickinson, TX 77539 USA
⁴Chevron Technical Center, 1400 Smith St, Houston, TX 77002 USA
⁵Chevron Technical Center, Richmond, CA, USA

11:30 - 12:00  Coatings to reduce fouling in plate heat exchangers: Two case studies
O. Santos¹, Y. Adriaenssens², C. Wictor³ and M. Nilsson³
¹Materials Technology and Chemistry, Alfa Laval Lund AB, PO Box 74, SE-221 00 Lund, Sweden.
²Chemours Belgium BVBA, Antoon Spinoystraat 6A, 2800 Mechelen, Belgium.
³Gasketed Plate Heat Exchangers – Technology Development, Alfa Laval Lund AB, PO Box 74, SE-221 00 Lund, Sweden.

12:00 - 12:30  Pigmented antifouling coatings for improved on-site inspection
C. Bischoff¹, J. R. Frandsen¹, I. Luna², L. Jackowski²
¹Danish Technological Institute, Kongsvang Allé, DK-8000 Aarhus C
²Chevron Energy Technical Center, 100 Chevron Way, Richmond, CA 94801

12:30 - 13:00  Final Discussion

13:00 - 14:00 Lunch