

Selected Publications Prof. Stefan Mecking

ORCID: 0000-0002-6618-6659. Researcher-ID: E-6991-2012.

Selected Peer-Reviewed Research Papers

- 276) F. Lin, M. Voccia, L. Odenwald, I. Göttker-Schnetmann, L. Falivene, L. Caporaso*, S. Mecking*: Origin of Suppressed Chain Transfer in Phosphinephenolato Ni(II) Catalyzed Ethylene Polymerization.
J. Am. Chem. Soc. **2023**, *145*, 27950 – 27957.
- 274) C. Hahn, I. Göttker-Schnetmann, I. Tzourtzouklis, M. Wagner, A. Müller, G. Floudas, S. Mecking, H. Frey*: Nopadiene: A Pinene-Derived Cyclic Diene as a Styrene Substitute for Fully Biobased Thermoplastic Elastomers.
J. Am. Chem. Soc. **2023**, *145*, 26688 – 26698.
- 272) M. Baur, N. K. Mast, J. Brahm, R. Habè, T. O. Morgen, S. Mecking*: High Density Polyethylene with In-Chain Photolyzable and Hydrolyzable Groups Enabling Recycling and Degradation.
Angew. Chem. Int. Ed. **2023**, *62*, e202310990.
- 271) T. F. Nelson*, D. Rothauer, M. Sander, S. Mecking*: Degradable and Recyclable Polyesters from Multiple Chain Length Bio- and Waste-Sourceable Monomers.
Angew. Chem. Int. Ed. **2023**, *62*, e202310729.
- 269) S. de Roo, F. Einsiedler, S. Mecking*: Catalytic Biorefining of Natural Oils to Basic Olefinic Building Blocks of Proven Chemical Valorization Schemes.
Angew. Chem. Int. Ed. **2023**, *62*, e202219222.
- 267) M. Eck, S. T. Schwab, T. F. Nelson, K. Wurst, S. Iberl, D. Schleheck, C. Link, G. Battagliarin, S. Mecking*: Biodegradable High Density Polyethylene-Like Material.
Angew. Chem. Int. Ed. **2023**, *62*, e202213438.
- 265) N. S. Schunck*, S. Mecking*: In vivo Olefin Metathesis in Microalgae Upgrades Lipids to Building Blocks for Polymers and Chemicals.
Angew. Chem. Int. Ed. **2022**, e202211285.
- 264) A. Fuchs, S. Mecking*: Controlled Cobalt-Mediated Free-Radical Co- and Terpolymerization of Carbon Monoxide.
J. Am. Chem. Soc. **2022**, *144*, 15879 – 15884.
- 263) M. Voccia, L. Odenwald, M. Baur, F. Lin, L. Falivene, S. Mecking*, L. Caporaso*: Mechanistic Insights on Ni(II)-Catalyzed Non-Alternating Ethylene-Carbon Monoxide Copolymerization.
J. Am. Chem. Soc. **2022**, *144*, 15111 – 15117.
- 262) L. Odenwald, F. P. Wimmer, N. K. Mast, M. G. Schußmann, M. Wilhelm, S. Mecking*: Molecularly Defined Polyolefin Vitrimers from Catalytic Insertion Polymerization.
J. Am. Chem. Soc. **2022**, *144*, 13226 – 13233.
- 260) F. Lin, S. Mecking*: Hydrophilic Catalysts with High Activity and Stability in Aqueous Polymerization to High Molecular Weight Polyethylene.
Angew. Chem. Int. Ed. **2022**, *61*, e202203923.
- 258) J. Park, A. Staiger, S. Mecking, K. I. Winey*: Ordered Nanostructures in Thin Films of Precise Ion-containing Multiblock Copolymers.
ACS Cent. Sci. **2022**, *8*, 388 – 393.
- 257) F. Lin, T. O. Morgen, S. Mecking*: Living Aqueous Microemulsion Polymerization with Robust Ni(II) Phosphinephenolato Catalysts.
J. Am. Chem. Soc. **2021**, *143*, 20605 – 20608.

- 256) M. Baur, F. Lin, T. O. Morgen, L. Odenwald, S. Mecking*: Polyethylene Materials with In-Chain Ketones from Non-Alternating Catalytic Copolymerization. *Science* **2021**, 374, 604 – 607.
- 255) J. Park, A. Staiger, S. Mecking, K. I. Winey*: Sub-3-Nanometer Domain Spacings of Ultrahigh- χ Multiblock Copolymers with Pendant Ionic Groups. *ACS Nano* **2021**, 15, 16738 – 16747.
- 254) A. Staiger, B. Paren, R. Zunker, S. Hoang, M. Häußler, K. Winey, S. Mecking*: Anhydrous Proton Transport within Phosphonic Acid Layers in Monodisperse Telechelic Polyethylenes. *J. Am. Chem. Soc.* **2021**, 143, 16725 – 16733.
- 251) E. Schiebel, M. Voccia, L. Falivene, I. Göttker-Schnetmann, L. Caporaso*, S. Mecking*: Neutral Unsymmetrical Coordinated Cyclophane Polymerization Catalysts. *Angew. Chem. Int. Ed.* **2021**, 60, 18472 – 18477.
- 246) E. Schiebel, M. Voccia, L. Falivene, L. Caporaso*, S. Mecking*: The Impact of Charge in a Ni(II) Polymerization Catalyst. *ACS Catal.* **2021**, 11, 5358 – 5368.
- 244) M. Häußler, M. Eck, D. Rothauer, S. Mecking*: Closed-Loop Recycling of Polyethylene-Like Materials. *Nature* **2021**, 590, 423 – 427.
- 242) C. Wang, X. Kang, S. Dai, F. Cui, Y. Li, H. Mu, S. Mecking*, Z. Jian*: Efficient Suppression of Chain Transfer and Branching via C_s -Type Shielding in a Neutral Ni(II) Catalyst. *Angew. Chem. Int. Ed.* **2021**, 60, 4018 – 4022.
- 238) T. O. Morgen, M. Baur, I. Göttker-Schnetmann, S. Mecking*: Photodegradable Branched Polyethylenes from Carbon Monoxide Copolymerization under Benign Conditions. *Nature Commun.* **2020**, 11, 3693.
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- 233) D. Bücker, A. Sickinger, J. Ruiz Perez, M. Oestlinger, S. Mecking*, M. Drescher*: Direct Observation of Chain Lengths and Conformations in Oligofluorene Distributions from Controlled Polymerization by Double Electron-Electron Resonance. *J. Am. Chem. Soc.* **2020**, 142, 1952 – 1956.
- 231) L. Yan, C. Rank, S. Mecking, K. Winey*: Gyroid and Other Ordered Morphologies in Single-Ion Conducting Polymers and Their Impact on Ion Conductivity. *J. Am. Chem. Soc.* **2020**, 142, 857 – 866.
- 230) M. Schnitte, J. S. Scholliers, K. Riedmiller, S. Mecking*: Remote Perfluoroalkyl Groups are Key to Living Aqueous Polymerization. *Angew. Chem. Int. Ed.* **2020**, 59, 3258 – 3263.
- 229) P. Kenyon, L. Falivene, L. Caporaso*, S. Mecking*: Ancillary Ligands Impact Branching Microstructure in Late Transition Metal Polymerization Catalysis. *ACS Catal.* **2019**, 9, 11552 – 11556.
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- 223) M. Schnitte, A. Staiger, L. A. Casper, S. Mecking*: Uniform Shape Monodisperse Single Chain Nanocrystals by Living Aqueous Catalytic Polymerization. *Nature Commun.* **2019**, 10, 2592.

- 218) E. Schiebel, S. Santacroce, L. Falivene, I. Göttker-Schnetmann, L. Caporaso, S. Mecking*: Tailored Strength Neighboring Group Interactions Switch Polymerization to Dimerization Catalysis.
ACS Catal. **2019**, 9, 3888 – 3894.
- 217) S. Stadler, I. Göttker-Schnetmann, S. Mecking*: Incorporation of Radicals During Ni(II)-Catalyzed Ethylene Insertion Polymerization.
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- 215) Y. Liu, S. Mecking*: Synthetic Polyester from Plant Oil Feedstock by Functionalizing Polymerization.
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- 211) F. Werschler, B. Lindner, C. Hinz, F. Conradt, P. Gumbsheimer, Y. Behovits, C. Negele, T. de Roo, O. Tzang, S. Mecking, A. Leitenstorfer, D. Seletskiy*: Efficient Emission Enhancement of Single CdSe/CdS/PMMA Quantum Dots through Controlled Near-Field Coupling to Plasmonic Bullseye Resonators.
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- 207) V. Goldbach, M. Krumova, S. Mecking*: Full Range Interconversion of Nanocrystals and Bulk Metal with a Highly Selective Molecular Catalyst.
ACS Catal. **2018**, 8, 5515 – 5525.
- 206) P. Kenyon, M. Wörner, S. Mecking*: Controlled Polymerization in Polar Solvents to Ultra-High Molecular Weight Polyethylene.
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- 202) L. Falivene, T. Wiedemann, I. Göttker gen. Schnetmann, L. Caporaso*, L. Cavallo, S. Mecking*: Control of Chain Walking by Weak Neighbouring Group Interactions in Unsymmetric Catalysts.
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- 188) T. Witt, M. Häußler, S. Kulpa, S. Mecking*: Chain Multiplication of Fatty Acids to Precise Telechelic Polyethylene.
Angew. Chem. Int. Ed. **2017**, 56, 7589 – 7594.
- 187) J. D. Ruiz Perez, S. Mecking*: Anisotropic Fluorescence Emission-Tuned Polymer Nanoparticles via Intersegmental Chain Packing.
Angew. Chem. Int. Ed. **2017**, 56, 6147 – 6151.
- 182) V. Goldbach, L. Falivene, L. Caporaso*, L. Cavallo, S. Mecking*: Single Step Access to Long-Chain α,ω -Dicarboxylic Acids by Isomerizing Hydroxycarbonylation of Unsaturated Fatty Acids.
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- 180) Z. Jian, L. Falivene, G. Boffa, S. Ortega Sánchez, L. Caporaso*, A. Grassi, S. Mecking*: Direct Synthesis of Telechelic Polyethylene by Selective Insertion Polymerization.
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- 178) F. Werschler, C. Hinz, F. Froning, P. Gumbsheimer, J. Haase, C. Negele, T. de Roo, S. Mecking, A. Leitenstorfer, D. Seletskiy*: Coupling of Excitons and Discrete Acoustic Phonons in Vibrationally Isolated Quantum Emitters. *Nano Lett.* **2016**, *16*, 5861 – 5865.
- 167) F. Ölscher, I. Göttker gen. Schnetmann, V. Monteil, S. Mecking*: Role of Radical Species in Salicylaldiminato Ni(II) Mediated Polymer Chain Growth: A Case Study for the Migratory Insertion Polymerization of Ethylene in the Presence of MMA. *J. Am. Chem. Soc.* **2015**, *137*, 14819 – 14828.
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- 163) T. Witt, F. Stempfle, P. Roesle, M. Häußler, S. Mecking*: Unsymmetrical α,ω -Difunctionalized Long-Chain Compounds via Full Molecular Incorporation of Fatty Acids. *ACS Catal.* **2015**, *5*, 4519 – 4529.
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- 152) P. Roesle, L. Caporaso*, M. Schnitte, V. Goldbach, L. Cavallo, S. Mecking*: A Comprehensive Mechanistic Picture of the Isomerizing Alkoxyacylation of Plant Oils. *J. Am. Chem. Soc.* **2014**, *136*, 16871 - 16881.
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- 137) T. Rünzi, S. Mecking*: Saturated Polar-Substituted Polyethylene Elastomers from Insertion Polymerization. *Adv. Funct. Mater.* **2014**, *24*, 387 – 395.
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Selected Reviews

- 241) S. Mecking*, M. Schütte: Neutral Nickel(II) Catalysts: from Hyperbranched Oligomers to Nanocrystal-Based Materials.
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Granted Patents

- 30) S. Mecking, M. Vielhaber-Flook, I. Göttker-Schnetmann, P. Kenyon: Functionalized Aluminium Reagent. US 10711016 B1, issued to The Goodyear Tire & Rubber Company July 14, 2020.
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- 22) M. Flook, H. Leicht, I. Göttker-Schnetmann, S. Mecking: Functionalized Elastomers. EP 3042786 B1, issued November 22, 2017 to The Goodyear Tire & Rubber Company. EP 3181592 B1, issued August 22, 2018. EP 3181593 B1, issued July 18, 2018. EP 3181603 B1, issued July 18, 2018. US 9969831 B2, issued May 15, 2018. US 9988479 B2, issued June 5, 2018. US 9994663 B2, issued June 12, 2018. US 10081694 B2, issued September 25, 2018. US 10087275 B2, issued October 2, 2018.
- 20) H. Leicht, I. Göttker-Schnetmann, S. Mecking, V. Bodart, T. Hermant: Process for the manufacture of vinyl chloride-containing copolymers. Priority: November 29, 2012. EP 2738187 B1, issued May 4, 2016 to Solvay SA.
- 19) F. Stempfle, S. Mecking: Aliphatic Long-Chain Polycondensates. Priority: August 10, 2012. EP 2695901 B1 issued to BASF SE September 14, 2016.
- 18) D. Quinzler, S. Mecking: Polymers made of Renewable Resources. EP 2528963 B1, issued to BASF SE September 23, 2015. US 9096715 B2, issued August 4, 2015. CN102869698B, issued November 25, 2015.
- 17) T. H. Steinke, H.-H. Goertz, S. Mecking, D. Quinzler: Production of Polyesters from Renewable Resources. Priority: June 4, 2009. EP 2258743 B1, issued to BASF SE January 28, 2015.
- 15) C. G. J. Aymonier, F. P. M. Cansell, S. Mecking, S. N. Moisan, V. Martinez: Synthesis of particles in dendritic structures in supercritical fluid environments. FR 2895289 B1 to Centre National de la Recherche Scientifique, issued August 21, 2009. EP 1971454 B1, issued February 16, 2011. US 7932311 B2, issued April 26, 2011.
- 14) M. M. Chowdhry, X. Sava, M. Haag, J. Wildeson, S. Mecking, L. Kolb: Method for Emulsion Polymerization of Olefins. US Pat. 7417098 B2 issued to BASF AG Aug. 26, 2008.
- 11) M. M. Chowdhry, M. Schmid, P. Preishuber-Pflügl, X. Sava, H. Weiß, S. Mecking, M. Zuideveld, F. M. Bauers: Method for the production of aqueous polymer dispersions. US Pat. 7566760 B2, issued July 28, 2009 to BASF AG.

- 10) M. M. Chowdhry, M. Schmid, P. Preishuber-Pflügl, X. Sava, H. Weiss, S. Mecking, F. M. Bauers: Method for Emulsion Polymerization of Olefins. US Pat. 7683145 B2, issued March 23, 2010. EP 1527103 B1, issued January 5, 2011 to BASF AG.
- 9) M. Schmid, M. M. Chowdhry, M. O. Kristen, S. Mecking, F. M. Bauers: Process for the production of aqueous polymer dispersions. U.S. Pat. 6800699 B2 to BASF, issued: October 5, 2004.
- 5) M. O. Kristen, L. Manders, S. Mecking, F. M. Bauers, R. Mülhaupt: Method for the Emulsion Polymerization of Olefins. Eur. Pat. 1240215 B1 to BASF AG, issued April 24, 2006. U.S. Pat. 7129292 B1 to BASF AG, issued October 31, 2006.
- 3) S. Mecking: Catalyst Composition. U.S. Pat. 6262196 B1 to Targor GmbH, issued July 17, 2001. Eur. Pat. 963385 B1 to Basell Polyolefine GmbH, issued June 16, 2004. U.S. Pat. 6384144 B1 to Basell Polypropylen GmbH, issued May 7, 2002.
- 1) W. Keim, S. Mecking: Palladium phosphine ligand catalyst. Priority: March 26, 1993. U.S. Pat. 5525566 to BP Chemicals Ltd., issued June 11, 1996.

Selected Invited Lectures (since 2010)

- 184) Closed Loop Recyclable and Degradable Polyethylene-Like Materials Enabled by Catalysis.
End-of-Life of Plastics Discussion Meeting, IIT Bombay, December 15, 2023.
- 183) Closed Loop Recyclable and Degradable Polyethylene-Like Materials Enabled by Catalysis.
Dr. R. A. Mashelkar Endowment Lecture, NCL Pune, December 14, 2023.
- 182) Closed Loop Recyclable and Degradable Polyethylene-Like Materials Enabled by Catalysis.
Dr. S. Sivaram Endowment Lecture, 17th International Conference on Polymer Science and Technology SPSI-Macro-2023, Guwahati, India, December 10, 2023.
- 181) Closed Loop Recyclable and Degradable Polyethylene-Like Materials Enabled by Catalysis.
ACS Fall Meeting, San Francisco, August 15, 2023.
- 180) Unconventional Polyethylene Microstructures from Functional Group Tolerant Polymerization Catalysis.
ACS Fall Meeting, ACS Award in Polymer Chemistry: Symposium in Honor of Karen I. Winey, San Francisco, August 15, 2023.
- 179) Organometallic Catalysis Enabling Closed-Loop Recyclable and Non-Persistent Polyolefin-like Materials.
Gordon Research Conference Organometallic Chemistry, Newport, July 11, 2023.
- 178) Integrated Approaches Comprising Olefin Metathesis to Enable Plant and Microalgae Oil Feedstock Utilization.
International Symposium on Olefin Metathesis (ISOM-XXIV), Bergen, July 6, 2023.
- 176) Closed Loop Recyclable and Degradable Polyethylene-Like Materials Enabled by Catalysis
Molecular and Supramolecular Mechanisms of Functional Group Tolerant and Aqueous Polymerization Catalysis
Milkovich Lecture Series, University of Akron, April 3 and 4, 2023.
- 175) Catalysis to Enable Degradable Polyolefins.
Netherlands Catalysis and Chemistry Conference, Noordwijkerhout, March 6, 2023.
- 169) Catalytic Routes to Polyethylene-like Polymers from Plant Oils for Closed Loop Recycling and Degradability.
Virginia Tech Solvay Seminar, September 29, 2021 (held online)
- 168) Catalytic Routes to Polyethylene-like Polymers from Plant Oils for Closed Loop Recycling and Degradability.
ChemBio Lecture 2021, University of Tokyo, September 28, 2021 (held online).
- 167) Designing Bio-Sourced Polymers that Enable Recycling
ACS Webinar, July 1, 2021.
- 165) Catalytic Routes to Main-Chain Functionalized Polyolefins
American Chemical Society Meeting. Macromolecular Chemistry: the Second Century, April 6, 2021 (held online).
- 162) New Plastics as Illuminated by Polyolefins.
8th Chemical Sciences and Society Summit, London, November 10-13, 2019.
- 158) Seed and Microalgae Oils as Feedstocks for Monomers and Polymers.
Science to Enable the Circular Economy, Discussion Meeting, Royal Society, London, June 24, 2019.
- 157) Shape Control in Catalytic Polymer Nanoparticle Synthesis.
University of Birmingham, June 5, 2019.

- 156) Organometallic Catalysis for Unconventional Feedstocks and Polymer Materials.
Imperial College, London, June 3, 2019.
- 155) Monomers and Main-Chain Functional Polyethylenes from Catalytic Upgrading of Seed and Microalgae Oils.
59th High Polymer Research Group Meeting, Pott Shrigley, April 29, 2019.
- 154) Organometallic Catalysis for Unconventional Feedstocks and Polymer Materials.
Organometallics and Main Group Seminar, University of Oxford, March 22, 2019.
- 150) Shape-Anisotropic Polymer Nanoparticles from Catalytic Synthesis.
Bordeaux Polymer Conference, May 28, 2018
- 147) Unconventional Polymer Architectures and Nanostructures from Functional Group Tolerant Catalysis.
Dutch Polymer Institute Annual Meeting, Eindhoven, November 8, 2017.
- 146) Unconventional Polyolefin Architectures and Nanostructures from Functional Group Tolerant Catalysis.
Advances in Polyolefins XI Workshop, Santa Rosa, September 26, 2017.
- 145) α,ω -Difunctional Polyethylene Telechelics Through Functional Group Tolerant Catalysis.
American Chemical Society Meeting, RSC Lectureship Symposium, San Francisco, April 4, 2017.
- 142) Catalytic Functionalization of Seed and Algae Oils.
6th EuCheMS Chemistry Congress, Seville, September 14, 2016.
- 141) Organometallic Free Radical Reactivity in Functional Group Tolerant Polymerization
4th Blue Sky Conference on Olefin Polymerization, Sorrento, June 30, 2016.
- 138) Aqueous Olefin Polymerization.
American Chemical Society Meeting, Gabor A. Somorjai Award Symposium in Honor of Prof. Maurice Brookhart, Denver, March 23, 2015
- 136) Sustainable Polymer Materials via Functional Group Tolerant Catalysis.
Talents du CNRS Award Symposium, Rennes, December 15, 2014.
- 133) To Branch or not to Branch in Functional Group Tolerant Polymerization Catalysis.
19th International Symposium on Homogeneous Catalysis, Ottawa, July 5 to 11, 2014.
- 132) To Branch or not to Branch in Functional Group Tolerant Polymerization Catalysis.
Applied Chemistry Lecture Series, Changchun Institute of Applied Chemistry of the Chinese Academy of Science, June 9, 2014.
- 131) Long-Chain Aliphatic Polycondensates to Bridge the Gap Between Semicrystalline Polyethylene and Traditional Polyesters.
6th International Symposium on Polymer Chemistry, Shanghai, June 4 to 7, 2014.
- 130) From Ideal Polymer Nanocrystals to Hyperbranched Oligomers with Functional Group Tolerant Catalysts.
Inaugural Symposium Prof. Dieter Vogt, University of Edinburgh, May 22, 2014.
- 125) Novel Feedstocks and Crystalline Structures by Functional Group Tolerant Polymerization Catalysis.
DPI Invention Award Session at the European Polymer Federation Meeting, Pisa, June 20, 2013.
- 123) Long-Chain Aliphatic Polycondensates from Plant Oils.
Joint ACS and RSC Meeting Sustainable Polymers, Safety Harbor, May 21, 2013.
- 122) Functional Group Tolerant Polymerization Catalysis.
9th Society of Polymer Science of Japan International Polymer Conference, Kobe, December 13, 2012.

- 121) Mechanistic Aspects of Functional Group Tolerant Polymerization Catalysis.
University of Tokyo, December 10, 2012.
- 120) Functional Group Tolerant Polymerization Catalysis.
Sumitomo Chemical, Sodegaura-City, December 7, 2012.
- 119) Functional Group Tolerant Polymerization Catalysis.
Tokyo Institute of Technology, Yokohama, December 6, 2012.
- 118) Functional Group Tolerant Polymerization Catalysis.
Solvay Campus, Brussels, October 10, 2012.
- 117) Colloidal Polyethylene Crystals and Polyethylene Mimicks by Late Transition Metal Catalysis.
Chemelot International Polyolefins Symposium, Maastricht, October 7 to 10, 2012.
- 113) Fluorescent Conjugated Polymer Nanoparticles.
Polymers in Dispersed Media Conference, Lyon, April 18, 2012.
- 112) Renewables to Chemicals by Functional Group Tolerant Organometallic Catalysis.
Materia, Pasadena, March 30, 2012.
- 111) Long-Chain Aliphatic α,ω -Difunctional Compounds and Polycondensates from Plant Oils.
American Chemical Society Meeting, Next-Generation Renewable Polymers Symposium, San Diego, March 25 to 29, 2012.
- 110) Opportunities from Functional Group Tolerant Polymerization Catalysis.
Dutch Polymer Institute, Eindhoven, January 26, 2012.
- 107) Novel Linear Longchain Difunctional Molecules and Plastics from Plant Oils.
9th European Society for the Science and Technology of Lipids Congress, Rotterdam, September 19, 2011.
- 104) Functional Group Tolerant Organometallic Polymerization Catalysis.
California Institute of Technology, Pasadena, April 1, 2011.
- 103) Late Transition Metal Complexes and Novel Polymeric Materials.
University of California, Irvine, March 30, 2011.
- 102) Conjugated Polymer Nanoparticles.
American Chemical Society Meeting, Creative Polymer Award Symposium, Anaheim, March 29, 2011.
- 99) Catalytic Insertion Polymerization Tolerant to Functional Groups. King Abdullah University of Science and Technology, Catalysis Center Inauguration, Thuwal, December 7, 2010.
- 98) Functional group tolerant organometallic catalysis: nanocrystals, conjugated polymer nanoparticles and sustainable polycondensates.
Laboratoire de Chimie et Procédés de Polymérisation (CPE – LCPP), Lyon, November 16, 2010.
- 97) Catalytic insertion polymerization tolerant to functional groups.
2nd Brazilian Workshop on Olefin Polymerization, Bento Goncalves, November 9, 2010.
- 96) Functional group tolerant polymerization catalysis. American Chemical Society Meeting, New Catalysis in Polymer Synthesis Symposium, Boston, August 22, 2010.