Dr Charles Romain
ORCID: 0000-0002-1851-8612
Twitter: @RomainGroup

c.romain@imperial.ac.uk
https://www.imperial.ac.uk/romain-group/
Web of Science/Publons profile

RESEARCH GROUP LEADER
Sustainable catalysis and materials

EMPLOYMENT

Since Sept. 2016	**Junior Research Fellow**, Imperial College London, Dpt. of Chemistry • Research interests: **Development of sustainable polymers** • Outputs: 7 publications, 3 as corresponding author (21 citations)
2016 (8 months)	**PDRA**, Imperial College London, Departments of Chemical Engineering and Chemistry, Groups of Prof. Jason Hallett and Prof. George Britovsek, • Project: **Catalytic biomass deconstruction** • Output: 1 publication
2013-2015	**PDRA**, Imperial College London, Department of Chemistry, Group of Prof. Charlotte K. Williams • Project: **New catalytic systems for polymers from renewables** • Outputs: 16 publications, 2 licenced patents
2012-2013	**Research scientist**, Econic Technologies, • Project: **Development of catalysts for polycarbonates from CO_2** • Output: 1 patent

EDUCATION

2011	**PhD in Chemistry**, University of Strasbourg (France), under the supervisions of Dr. Samuel Dagorne and Dr. Stephane Bellemin-Laponnaz • Thesis Title: *"Synthesis and characterization of group 4 N-Heterocyclic Carbene complexes and application to the ring-opening polymerization of cyclic esters and carbonates"* • Output: 7 publications, 1 patent
2008	Combined **French Engineering Degree in Chemistry** (ENSCR) and **Master of Science in Chemistry** with distinction, University of Rennes 1 (France)

EXPERTISE

Organic and polymer chemistry: Synthesis and characterization techniques including IR, NMR (1D, 2D, DOSY), GC, GC/MS, MS, GPC (multi-detection)

Organometallic chemistry: Synthesis, characterization and manipulation of air-sensitive compounds, including Schlenk techniques, glove box, J. Young NMR tubes, high pressure reactors, fluorescence spectroscopy and cyclic voltammetry

Computational chemistry: Proficient in Gaussian software package for reactivity and mechanistic investigations to complement synthetic experiments

Research data management: Use of electronic lab notebooks (LabArchive) and data repositories, Publication of Findable, Accessible, Interoperable, Reusable (FAIR) data

PUBLICATIONS

30 publications in peer-reviewed journals (+ 1 submitted), including 3 *Angew. Chem. Int. Ed.*, 2 *J. Am. Chem. Soc.*, 3 *ACS Catal.*, 3 *Chem. Commun.*, **h-index: 21,** ~ 1700 citations (WoS profile)

3 book chapters in peer-reviewed books

GRANTS and CONTRACTS

Ongoing	**Co-I** on one **collaborative interdisciplinary grant applications** (> £1M)
12/2019	**Strategic Priorities Fund** (ICL fund) - £18.5K, dedicated to PDRA time to draft a white paper *"Greener Plastic Futures: Enabling Progress through Molecular Science Innovation"*
02/2018	**EPSRC grant, Co-I**, (EP/S025456/1, £1M total, £180k personal), *"Holistic integration of technology, design, and policy for a greener plastic future"*, inter-faculty project led by Prof. Jason Hallett (PI)
Since 2017	**Consulting projects** with Imperial Consultants (ICON) - £6K
05/2016	**Junior Research Fellowship**, ICL, £235k + 1 PhD studentship

TEACHING and STUDENT SUPERVISION

Teaching activities and qualifications:

- **Higher Education Academy Fellowship** (obtained 14/01/20, PR179165)
- **Lectures** to UG and PG students in the **Sustainable Chemistry** course (~ 70 students/year)
- **Inorganic chemistry tutorials** to groups of ~ 8 students, first and second year UG students
- **Lab demonstrating** (incl. assessment by *viva voce*) in chemistry teaching lab
- Completed Learning and Teaching Development Programme

Student supervision and project design:

- Since 09/2016: supervision of 1 PDRA, 1 PhD, 5 BSc, 2 MSci, and 1 MRes projects which led to 2 publications (*ACS Catal.*, *Dalton Trans.*) + 1 under review
- 2013-2016: Co-design of projects for and co-supervision of 2 PhD students which led to 7 publications (one currently holding a faculty position at Tongji University, Shanghai)

EVIDENCE OF ESTEEM

- **8 invited talks** at national and international seminars and symposia
- **1 viva examination** of a PhD student (+ 1 invitation)
- **Reviewed 24 manuscripts for 9 different journals** since 2017 (Publons profile), including *Nature Commun., Angew. Chem. Int. Ed.*, *Polym. Chem.*, *Macromolecules*, *ACS Catal.*…
- **Member of the steering committee** of the **Ocean Plastic Solution Network** at ICL

OUTREACH ACTIVITIES

- Lecture at the *London International Youth Science Forum 2019* (~500 students, 75 nationalities) and talk at *A Pint of Science Festival 2018* (~ 50 people)
- Co-organization of stalls for Imperial Festival with scientific demonstrations to the public
- Volunteering at Native Scientists, scientific demonstrations in French schools in London

PATENTS

3 patents (incl. 2 under license):

- **"Method and catalyst systems for preparing polymers and block copolymers"**, C. K. Williams, C. Romain, M. Kember, WO2014184578, PCT application number PCT/GB2014/051511; licensed to Econic-Technologies
- **"Improved Heterodinuclear Mixed Catalysts for CO_2/Epoxide Copolymerisation"**, P. K. Saini, C. Romain, J. A. Garden, C. K. Williams, Patent application number 1308978.4; licensed to Econic-Technologies.
- **"N-Heterocyclic carbene based zirconium complexes for use in lactones ring opening polymerization"**, S. Bellemin-Laponnaz, S. Dagorne, C. Romain, P. Steffanut, WO 2012076140, PCT/EP2011/006076; licensed to Clariant International Ltd.

PUBLICATION LIST

30 refereed papers (see Publons/WoS profile)**:**

1) C. Romain,* S. Bellemin-Laponaz,* S. Dagorne,* *"Recent Progress on NHC-stabilized Early Transition Metal (Group 3-7) Complexes: Synthesis and Applications", Coord. Chem. Rev.,* **2020***, Just Accepted,* DOI: 10.1016/j.ccr.2020.213411
2) D. W. P. Tay, J. D. Nobbs, C. Romain, A. J. P. White, S. Aitipamula, M. Van Meurs, G. J. P. Britovsek*, *"gem-Dialkyl Effect in Diphosphine Ligands: Synthesis, Coordination Behavior, and Application in Pd-Catalyzed Hydroformylation"*, *ACS Catal.*, **2020**, *10*, 1, 663-671, DOI: 10.1021/acscatal.9b03007
3) S. Gesslbauer, R. Savela, Y. Chen, A. J. P. White, C. Romain,* *"Exploiting non-covalent interactions for room temperature heteroselective rac-lactide polymerisation using aluminium catalysts"*, *ACS Catal.*, **2019**, 9, 7912-7920, https://doi.org/10.1021/acscatal.9b00875
4) A. Barba, S. Dominguez, C. Gomez, D. P. Martinsen, C. Romain,* H. S. Rzepa,* F. Seoane, *"Workflows allowing creation of journal article supporting information and FAIR-enabled publication of spectroscopic data"*, *ACS Omega*, **2019**, *DOI: 10.1021/acsomega.8b03005*; https://doi.org/10.1021/acsomega.8b03005
5) T. Flack, C. Romain, A. J. P. White, P. R. Haycock, A. Barnard*, *"Design, Synthesis, and Conformational Analysis of Oligobenzanilides as Multifacial a-Helix Mimetics"*, *J. Org. Lett.* **2019**, *21*, 4433-4438, https://doi.org/10.1021/acs.orglett.9b01115
6) C. Vriamont, T. Chen, C. Romain, P. Corbett, P. Manageracharath, J. Peet, C. Conifer, J. Hallett, G. Britovsek*, *"From lignin to chemicals: Hydrogenation of lignin models and mechanistic insights into hydrodeoxygenation via low temperature C-O bond cleavage"*, *ACS Catal.*, **2019**, 9, 2345-2354; DOI: http://doi.org/10.1021/acscatal.8b04714
7) S. Gesslbauer, H. Cheek, A. J. P. White, C. Romain,* *"Highly active aluminium catalysts for room temperature ring-opening polymerisation of rac-lactide"*, *Dalton Trans.* **2018**, 47, 10410-10414, https://doi.org/10.1039/C8DT01526K
8) C. Romain, J. Garden, G. Trott, A. Buchard, A. J. P. White, C. K. Williams,* *"Di-Zinc-Aryl Complexes: CO_2 Insertions and Applications in Polymerisation Catalysis*", *Chemistry Eur. J.* **2017**, *23*, 7367-7376 (**Very Important Paper**). http://onlinelibrary.wiley.com/doi/10.1002/chem.201701013/full.
9) Y. Zhu. C. Romain, C. K. Williams,* *"Sustainable polymers from renewable resources"*, *Nature* **2016**, *540*, 354-362; https://www.nature.com/articles/nature21001.
10) A. Thevenon, C. Romain, M. S. Bennington, A. J. P. White, H. J. Davidson, S. Brooker, C. K. Williams,* *"Dizinc lactide polymerisation catalysts: hyperactivity by control of ligand conformation and metallic cooperativity"*, *Angew. Chem. Int. Ed.* **2016**, *55*, 8680-8685 (**Hot paper)**; http://onlinelibrary.wiley.com/doi/10.1002/anie.201602930/abstract.

11) C. Romain,* Y. Zhu, P. Dingwall, S. Paul, H. S. Rzepa, A. Buchard, C. K. Williams,* *"Chemoselective polymerizations from mixtures of epoxide, lactone, anhydride and carbon dioxide"*, *J. Am Chem. Soc.* **2016**, *138*, 4120-4131; http://pubs.acs.org/doi/abs/10.1021/jacs.5b13070.

12) S. Giarola, C. Romain, C. K. Williams, J. P. Hallett, N. Shah,* *"Techno-economic assessment of the production of phthalic anhydride from corn stover"*, *Chem. Eng. Res. Des.* **2016**, *107*, 181-194; http://www.sciencedirect.com/science/article/pii/S0263876215004086.

13) C. Romain, M.S. Bennington, A. J. P. White, C. K. Williams,* S. Brooker,* *"Macrocyclic dizinc(II) alkyl and alkoxide complexes: reversible CO_2 uptake and polymerization catalysis testing"*, *Inorg. Chem.* ***2015***, *54*, 11842-11851; http://pubs.acs.org/doi/abs/10.1021/acs.inorgchem.5b02038.

14) C. Romain, D. Speckelinn, K. Miqueu, J. M. Sotiropoulos, C. Fliedel, S. Bellemin-Laponaz,* S. Dagorne,* *"Unusual benzyl migration reactivity in NHC-bearing group 4 metal chelates: synthesis, characterization, and mechanistic investigations"*, *Organometallics* ***2015***, *34*, 4854-4863; http://pubs.acs.org/doi/abs/10.1021/om501143t.

15) Y. Zhu, C. Romain, C. K. Williams,* *"Selective polymerization catalysis: controlling the metal chain end group to prepare block copolyesters"*, *J. Am. Chem. Soc.* **2015**, 137, 12179-12182; http://pubs.acs.org/doi/full/10.1021/jacs.5b04541.

16) S. Paul, C. Romain, J. Show, C. K. Williams,* *"Sequence selective polymerization catalysis: A new route to ABA block copoly(ester-b-carbonate-b-ester)"*, *Macromolecules* **2015**, 48, 6047-6056; http://pubs.acs.org/doi/abs/10.1021/acs.macromol.5b01293.

17) Y. Zhu, C. Romain, V. Poirier, C. K. Williams,* *"Influences of a dizinc catalyst and bifunctional chain transfer agents on the polymer architecture in the ring-opening polymerization of ε-caprolactone", Macromolecules* **2015**, *48*, 2407-2416; http://pubs.acs.org/doi/abs/10.1021/acs.macromol.5b00225.

18) S. Paul, Y. Zhu, C. Romain, R. Brooks, P. K. Saini, C. K. Williams,* *"Ring-opening copolymerization (ROCOP): Synthesis and properties of polyesters and polycarbonates"*, *Chem. Commun.* **2015**, *51*, 6459-6479 ; http://pubs.rsc.org/en/content/articlelanding/2015/cc/c4cc10113h.

19) M. Winkler, C. Romain, M. A. R. Meier,* C. K. Williams,* *"Renewable polycarbonates and polyesters from 1,4-cyclohexadiene"*, *Green Chem.* **2015**, *17*, 300-306; Part of the collection **2015 Most accessed Green Chemistry articles** (top 10%), http://pubs.rsc.org/en/Content/ArticleLanding/2015/GC/C4GC01353K.

20) C. Romain, C. Fliedel, S. Bellemin-Laponnaz,* S. Dagorne,* *"NHC bis-phenolate aluminium chelates: Synthesis, structure and use in lactide and trimethylene carbonate polymerization"*, *Organometallics* **2014**, *33*, 5730-5739; http://pubs.acs.org/doi/abs/10.1021/om5004557.

21) P. K. Saini, C. Romain, C. K. Williams,* *"Dinuclear metal catalysts: improved performance of heterodinuclear mixed catalysts for CO_2-epoxide copolymerization"*, *Chem. Commun*. **2014**, 50, 4164-4167; http://pubs.rsc.org/en/Content/ArticleLanding/2014/CC/c3cc49158g.

22) P. K. Saini, C. Romain, Y. Zhu, C. K. Williams,* *"Di-magnesium and zinc catalysts for the copolymerization of phthalic anhydride and cyclohexene oxide"*, *Polym. Chem.* **2014**, *5*, 6068-6075; http://pubs.rsc.org/en/Content/ArticleLanding/2014/PY/C4PY00748D.

23) C. Romain, S. Choua, J.-P. Collin, M. Heinrich, C. Bailly, L. Karmazin-Brelot, S. Bellemin-Laponnaz, S. Dagorne,* *"Redox and luminescent properties of robust and air-stable N-heterocyclic carbene group 4 metal complexes"*, *Inorg. Chem.* **2014**, *53*, 7371-7376; http://pubs.acs.org/doi/abs/10.1021/ic500718y.

24) C. Romain, C. K. Williams,* *"Chemoselective polymerization control: From mixed monomer feedstock to copolymers", Angew. Chem. Int. Ed.* **2014**, *53*, 1607-1610; **Very Important Paper,** http://onlinelibrary.wiley.com/enhanced/doi/10.1002/anie.201309575

25) S. Dagorne,* S. Bellemin-Laponnaz,* C. Romain, *"Neutral and cationic N-heterocyclic carbene zirconium and hafnium benzyl complexes: highly regioselective oligomerization of 1-hexene with a preference for trimer formation"*, *Organometallics* **2013**, *32*, 2736-2743; http://pubs.acs.org/doi/abs/10.1021/om400182d.

26) C. Romain, B. Heinrich, S. Bellemin-Laponnaz,* S. Dagorne,* *"A robust zirconium N-heterocyclic carbene complex for the living and highly stereoselective ring-opening polymerization of rac-lactide"*, *Chem. Commun*. **2012**, *48*, 2213-2215 ; http://pubs.rsc.org/en/Content/ArticleLanding/2012/CC/c2cc16819g.

27) C. Romain, V. Rosa, C. Fliedel, F. Bier, F. Hild, R. Welter, S. Dagorne,* T. Avilés, *"Highly active zinc alkyl cations for the controlled and immortal ring-opening polymerization of ε-caprolactone"*, *Dalton Trans*. **2012**, *41*, 3377-3379; http://pubs.rsc.org/en/Content/ArticleLanding/2012/DT/c2dt12336c.

28) C. Romain, K. Miqueu, J.-M. Sotiropoulos, S. Bellemin-Laponnaz,* S. Dagorne,* *"Non-innocent behavior of a tridentate NHC chelating ligand coordinated onto a zirconium(IV) center"*, *Angew. Chem. Int. Ed.* **2010**, *49*, 2198-220; http://onlinelibrary.wiley.com/enhanced/doi/10.1002/anie.200906702.

29) C. Romain, L. Brelot, S. Bellemin-Laponnaz,* S. Dagorne,* *"Synthesis and structural characterization of a novel family of titanium complexes bearing a tridentate bis-phenolate-N-heterocyclic carbene dianionic ligand and their use in the controlled ROP of rac-lactide"*, *Organometallics* **2010**, *29*, 1191-1198;

http://pubs.acs.org/doi/abs/10.1021/om901084n.

30) C. Romain, S. Gaillard, M. K. Elmkaddem, L. Toupet, C. Fischmeister,* C. M. Thomas,* J.-L. Renaud,* *"New dipyridylamine ruthenium complexes for transfer hydrogenation of aryl ketones in water"*, *Organometallics* **2010**, *29*, 1992-1995, http://pubs.acs.org/doi/abs/10.1021/om100127f.

3 book chapters:

- S. Dagorne, C. Romain, *"Polymerization catalysis by metal phenolates"*, in *"Patai's Chemistry of Functional groups"*, ed. J. Zabicky, J. Wiley & Sons, Ltd, **2017**; http://onlinelibrary.wiley.com/doi/10.1002/9780470682531.pat0853/abstract.
- C. Romain, C. K. Williams, *"Combining sustainable polymerization routes for the preparation of polyesters, polycarbonates and copolymers"* in *"Green Polymer Chemistry: Biobased Materials and Biocatalysis"*, ed. H.N. Cheng, R. A. Gross, P. B. Smith, *ACS Symposium Series*, **2015**, Vol. 1192, Ch. 9, pp 135-146; http://pubs.acs.org/doi/abs/10.1021/bk-2015-1192.ch009
- C. Romain, A. Thevenon, P. K. Saini, C. K. Williams, *"Dinuclear metal complex-mediated formation of CO_2-based polycarbonates"* in "*Topics in Organometallics*", Springer, Berlin Heidelberg, **2015**, Ch. 95; https://link.springer.com/chapter/10.1007/3418_2015_95

3 patent applications:

- *"Method and catalyst systems for preparing polymers and block copolymers"*, C. K. Williams, C. Romain, M. Kember, WO2014184578, PCT application number PCT/GB2014/051511; licensed to Econic-Technologies
- *"Improved Heterodinuclear Mixed Catalysts for CO_2/Epoxide Copolymerisation"*, P. K. Saini, C. Romain, J. A. Garden, C. K. Williams, Patent application number 1308978.4; licensed to Econic-Technologies.
- *"N-Heterocyclic carbene based zirconium complexes for use in lactones ring opening polymerization"*, S. Bellemin-Laponnaz, S. Dagorne, C. Romain, P. Steffanut, WO 2012076140, PCT/EP2011/006076;

INVITED TALKS (since 09/2016):

1) **Stay at Home Polymer Webinar**, online webinar series organized by Dr. Etienne Grau (LCPO, Bordeaux), May 2020, ~ 200 views (YouTube)

2) **University of Bath** (UK), seminar organized by the CDT in Catalysis*, January 2019*;

3) **University of Strasbourg** (France), seminar organized by the Institute de Chimie, *December 2018*;

4) **Abo University**, Turku (Finland), one day symposium, *November 2018*;

5) **Queen Mary University of London** (UK), *"Harnessing FAIR data"* symposium, organized by the Science and Engineering South Consortium, *September 2018;*

6) **Imperial College London** (UK), Frankland Symposium, *June 2018;*

7) **London Centre for Nanotechnology** (UK), Lunchtime seminar, *November 2017*;

8) **Imperial College London** (UK), Postgraduate symposium, *September 2017.*

RECENT OUTREACH ACTIVITIES:

- **University of 3rd Age** (U3A), *June 2020 (postponed)*: Talk at a science seminar (expected ~ 100 attendees)

- **Notting Hill and Ealing High School**, *March 2020*: Talk during assembly time (~ 140 pupils, aged from 6yo to 11yo) and lecture during a science course (~ 90 pupils, 13yo-14yo)

- **Faculty of Natural Science Research Showcase**, **part of panel of experts,** *September 2019*, discussion and Q&A with public audience, ~ 100 attendees.

- **London International Youth Science Forum**, *July 2019*: Lecture and discussion about plastics and sustainability (~500 students, ~ 17yo, 75 nationalities)

- **A Pint of Science Festival**, *Spring 2018*, talk to a public audience ~ 50 people

- **Volunteer at the Native Scientist**, *since 2017*, regular visits to bilingual schools, ~ 60 pupils per visit, about 2 visits per year (Native Scientist is a network of international scientists created to tackle educational disadvantage through science outreach)

- **Imperial College Festival**, every year, co-organization of stalls with scientific demonstrations to the public