Prof. Dr. Sonja Herres-Pawlis

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Working group vision and contribution to catalaix

Prof. Dr. Sonja Herres-Pawlis heads the Chair of Bioinorganic Chemistry, where her team works on current issues in bioinorganic chemistry and the synthesis and recycling of bioplastics. The team combines methods of coordination chemistry with modern spectroscopic methods (e.g. stopped-flow/fluorescence and reactRaman spectroscopy) with density functional theory and machine learning methods to create and characterise fast oxidation catalysts, robust and fast catalysts for lactone polymerisation and the depolymerisation of polyesters, but also nitrene systems and electron transfer systems. Especially in the field of bioplastics, scaling up is a key issue to bring basic research into application. Another focus of the work is chemical workflows and chemical research data management.

Current & Previous Positions

Since 01/15	Chair of Bioinorganic Chemistry (W3) at the RWTH Aachen University, Germany
11/11 - 12/14	Professor (W2tt) at the Ludwig-Maximilians-University, Munich, Germany
07/09 – 10/11	Liebig Habilitation fellow at Technical University of Dortmund under the mentorship of Prof. Dr. K. Jurkschat, Germany: Sustainable polymerisation catalysis with transition metal N donor complexes
11/06 –04/11	Visiting Scholar in the group of Prof. T. Daniel P. Stack at Stanford University, CA (several research stays): Copper guanidine complexes as biomimimetic tyrosinase models
11/06 – 06/09	Postdoctoral/Habilitation fellow at University of Paderborn, Germany: Sustainable polymerisation catalysis with zinc and copper N donor complexes
05/06 – 10/06	Postdoctoral fellow in the group of Prof. T. Daniel P. Stack at Stanford University, CA

Education

30.11.12	Habilitation in inorganic chemistry at TU Dortmund University
20.10.05	Ph.D. in Chemistry (Dr.rer.nat.), summa cum laude
11/02 – 09/05	Ph.D. thesis at the University of Paderborn, Germany, under supervision of Prof. Dr. G. Henkel, dissertation: „Oxygen activation and transfer mediated by copper(I) complexes with polyfunctional guanidine ligands“
8.10.02	Diploma in Chemistry („excellent“) at the University of Paderborn, Germany
09/01 – 02/02	ERASMUS-Research stage at the Ecole de Chimie de Montpellier, France
10/98 - 03/02	Chemistry studies at University of Paderborn, Germany

Fellowships and Awards

09/22	Chemistry Europe Fellow
12/14	Arnold-Sommerfeld Award of the Bavarian Academy of Sciences and Arts
11/11	Innovation Prize of the state of Northrhine-Westphalia

Since 12/10	Membership in the “Junges Kolleg” (Young Scholar Union) of the Academy of Science and Arts of Northrhine-Westphalia
07/09 – 10/11	Liebig-Habilitation stipend of the Chemical Industry Fund
07/08	Research Prize 2008 of the University of Paderborn for the project „Theoretical analysis of lactide polymerisation in a virtual grid environment“
01/07 – 06/09	PostDoc-/Habilitation stipend of the University of Paderborn
05/06 – 10/06	DAAD Research fellowship
01/06	Ph.D. thesis award of the University of Paderborn
05/05 – 10/05	Ph.D. finalising stipend of the University of Paderborn
03/04	Aventis [i]Lab Award Lecture Prize
05/03 – 04/05	Fonds fellowship of the Chemical Industry Fund

Contributions to the science system

2014 – 2020	Member of the programme committee of the SPP1740 “Reactive bubbly flows”
2014 – 2017	Speaker of the interdisciplinary research unit FOR1405 “Dynamics of electron transfer processes in bioinorganic systems”
2016 – 2019	PI of IRTG SeleCa “Selectivity in Chemo- and Biocatalysis”
Since 2016	PI of SFB 985 “Functional Microgels and Microgel Systems”
Since 2016	Member of the Editorial Board of Polyhedron
Since 2018	Member of the Steering Committee Molecular Science & Engineering of RWTH Aachen
Since 2019	Member of the ERS Committee of RWTH Aachen
Since 2019	Member of the Digitalisation Committee of RWTH Aachen
Since 2019	Co-Speaker of the NFDI4Chem initiative
Since 2020	Member of the Strategy Board of RWTH Aachen
Since 2020	Member of the Editorial Board of J. Biol. Inorg. Chem.
Since 2021	Member of the International Advisory Board of the European Journal of Inorganic Chemistry
Since 2021	Member of the Carl-Duisberg Prize selection committee
Since 2022	Member of the Editorial Board of the European Journal of Inorganic Chemistry
2020-2022	Head of the Chemistry Department
Since 2022	Member of the Editorial Board of EurJIC
Since 2022	Co-Speaker of the GDCh-Fachgruppe Sustainable Chemistry
Since 2022	Co-Speaker of the Strategy Board of RWTH Aachen
Since 2022	Co-Speaker of the BMBF funded project Knowledge Graph der Data Literacy Alliance (Dalia)
Since 2022	Founder of the Aachen Bioplastics Cycle – Living Lab Incubator (together with Prof. Dr. S. Böschen)
Since 2023	Chair of the Carl-Duisberg Prize selection committee
2024	Organisation of the Chemiedozententagung (ADUC Conference) at Aachen

Selected Projects

Since 2020	UPLIFT (sUstainable PLastIcs for the Food and drink packaging industry, EU project)
Since 2022	BioPlastiCycle and LignoTex (both BioSC projects on the topic of bioplastics)
Since 2023	CIRCON – Circular Materials Innovation Platform for Continuous Polymerization of Novel Materials and Closed-Loop Lifecycle testing (VW foundation project)

Most important scientific contributions

1. R. D. Rittinghaus, J. Zenner, A. Pich, M. Kol, S. Herres-Pawlis, Angew. Chem. Int. Ed. 2022, e202112853
2. R. D. Rittinghaus, A. Karabulut, A. Hoffmann, S. Herres-Pawlis, Angew. Chem. 2021, 133, 21965-21971; Angew. Chem. Int. Ed. 2021, 60, 21795-21800.
3. A. Hermann, S. Hill, A. Metz, J. Heck, A. Hoffmann, L. Hartmann, S. Herres-Pawlis, Angew. Chem. 2020, 132, 21962-21968; Angew. Chem. Int. Ed. 2020, 59, 21778–21784
4. R. D. Rittinghaus, P. M. Schäfer, P. Albrecht, C. Conrads, A. Hoffmann, A. N. Ksiazkiewicz, O.

Bienemann, A. Pich, S. Herres-Pawlis, ChemSusChem 2019, 12, 2161 – 2165.
5. J. Moegling, A. Hoffmann, F. Thomas, N. Orth, P. Liebhäuser, U. Herber, R. Rampmaier, J. Stanek, G. Fink, I. Ivanović-Burmazović, S. Herres-Pawlis, Angew. Chem. 2018, 130, 9294 – 9299; Angew. Chem. Int. Ed. 2018, 57, 9154 - 9299.
6. B. Dicke, A. Hoffmann, J. Stanek, M. S. Rampp, B. Grimm-Lebsanft, F. Biebl, D. Rukser, B. Maerz, D. Göries, M. Naumova, M. Biednov, G. Neuber, A. Wetzel, S. M. Hofmann, P. Roedig, A. Meents, J. Bielecki, J. Andreasson, K. Beyerlein, H. N. Chapman, C. Bressler, W. Zinth, M. Rübhausen, S. Herres-Pawlis, Nature Chemistry 2018, 10, 355–362.
7. P. Liebhäuser, K. Keisers, A. Hoffmann, T. Schnappinger, I. Sommer, A. Thoma, C. Wilfer, R. Schoch, K. Stührenberg, M. Bauer, M. Dürr, I. Ivanović-Burmazović, S. Herres-Pawlis, Chem. Eur. J. 2017, 23, 12171 – 12183.
8. T. Rösener, O. Bienemann, K. Sigl, N. Schopp, F. Schnitter, U. Flörke, A. Hoffmann, A. Döring, D. Kuckling, S. Herres-Pawlis, Chem. Eur. J. 2016, 22, 13550 – 13562.
9. A. Hoffmann, S. Binder, A. Jesser, R. Haase, U. Flörke, M. Gnida, M. Salomone Stagni, W. Meyer-Klaucke, B. Lebsanft, L. E. Grünig, S. Schneider, M. Hashemi, A. Goos, A. Wetzel, M. Rübhausen, S. Herres-Pawlis, Angew. Chem. 2014, 126, 305 - 310.
10. A. Hoffmann, C. Citek, S. Binder, A. Goos, M. Rübhausen, O. Troeppner, I. Ivanović-Burmazović, E. C. Wasinger, T. D. P. Stack, S. Herres-Pawlis, Angew. Chem. 2013, 125, 5508 - 5512.

Patents

All patents deal with bioplastics.

1. C. Strohmann, S. Herres-Pawlis, V. Gessner, J. Börner, P. Eckert, Anwendung von Diamin-, Zink-Komplexen in der effizienten Polymerisation von Lactid, Deutsche Patentanmeldung am 28.05.09, Veröffentlichungsdatum: 02.12.2010, Veröffentlichungsnummer: DE102009023656A1.
2. K. Jurkschat, S. Herres-Pawlis, G. Bradtmöller, J. Börner, M. Schürmann, M. Gock, Anwendung von polynuklearen Aminoethanolat-Zink-Komplexen in der effizienten Polymerisation von Lactid, Deutsche Patentanmeldung am 30.06.09, Veröffentlichungsdatum: 13.02.2011, Veröffentlichungsnummer: DE102009031594A1.
3. C. Strohmann, S. Herres-Pawlis, V. Gessner, J. Börner, P. Eckert, K. Jurkschat, G. Bradtmöller, M. Schürmann, M. Gock, [DE] VERFAHREN ZUR KATALYTISCHEN RINGÖFFNUNGSPOLYMERISATION VON CYCLISCHEN MONOMEREN, [EN] PROCESS FOR CATALYTIC RING-OPENING POLYMERIZATION OF CYCLIC MONOMERS, [FR] PROCÉDÉ DE POLYMÉRISATION PAR OUVERTURE DE CYCLE CATALYTIQUE DE MONOMÈRES CYCLIQUES, Europäische Patentanmeldung am 27.05.2010, Veröffentlichungsdatum: 02.12.2010, Veröffentlichungsnummer: WO002010136544A1.
4. I. Bechthold, J. Börner, S. Herres-Pawlis, R. Kopitzky, [DE] Verfahren zur Herstellung eines Polyesters sowie Zusammensetzung und Formkörper umfassend einen derartigen Polyester, [EN] Producing a polyester, useful to produce molded bodies, comprises carrying out dehydration or partial condensation of hydroxycarboxylic acid and dicarboxylic acid, adding zinc containing catalyst and performing polycondensation, Deutsche Patentanmeldung am 17.12.2010, Veröffentlichungsdatum: 21.06.2012, Veröffentlichungsnummer: DE102010054892A1.
5. S. Hill, A. Hermann, L. Hartmann, S. Herres-Pawlis, Biologisch abbaubare Klebstoff-Zusammensetzung, Deutsche Patentanmeldung am 17.09.2020, Veröffentlichungs-datum: 17.03.2022, Veröffentlichungsnummer: DE102020124314A1.
6. S. Hill, A. Hermann, L. Hartmann, S. Herres-Pawlis, [DE] BIOLOGISCH ABBAUBARE KLEBSTOFF-ZUSAMMENSETZUNG, [EN] BIODEGRADABLE ADHESIVE COMPOSITION, [FR] COMPOSITION D'ADHÉSIF BIODÉGRADABLE, Europäische Patentanmeldung am 16.09.2021, Veröffentlichungsdatum: 24.03.2022, Veröffentlichungsnummer: WO002022058421A1.