CURRICULUM VITAE—Prof. RADEK ZBOŘIL, Ph.D.

PERSONAL INFORMATION

Family name: Zbořil
First Name: Radek
Nationality: Czech Republic
Date of birth: 21 May, 1973
ORCID: 0000-0002-3147-2196
Researcher ID: K-1530-2019
Scopus ID: 6602583148

https://www.rcptm.com/about/personnel/radek-zboril/#about

EDUCATION

2000 Postdoctoral stays at the University of Delaware, USA, and the University of Tokyo, Japan
1996–2000 PhD studies at Palacký University Olomouc, the Czech Republic
1991–1996 Master's studies of Mathematics and Chemistry at Palacký University Olomouc, the Czech Republic

CURRENT POSITION(S)

Since 2021 Scientific Director of the Regional Centre of Advanced Technologies and Materials (RCPTM) of the Czech Advanced Technology and Research Institute (CATRIN) at Palacký University Olomouc, the Czech Republic (https://www.rcptm.com/)

Since 2020 Head of Materials-Envi Lab, Centre of Energy and Environmental Technologies (CEET), VSB-Technical University of Ostrava, the Czech Republic.

PREVIOUS POSITIONS

2010–2020 Full Professor of Physical Chemistry; General Director of the Regional Centre of Advanced Technologies and Materials, Palacký University Olomouc
2006–2009 Associate Professor of Physical Chemistry, Palacký University Olomouc
2002–2005 Project leader at Palacký University Olomouc

FELLOWSHIPS AND AWARDS (Selection)

2020–2021 Highly Cited Researcher in Chemistry, awarded by Clarivate Analytics, USA
2021 World's top 2% scientists according to the Stanford University
2019 Highly Cited Researcher in Cross-Field, awarded by Clarivate Analytics, USA
Since 2019 Visiting Professor at the Institute of Organic Chemistry and Biochemistry, Czech Academy of Sciences, Prague
2018 Highly Cited Researcher in Chemistry, awarded by Clarivate Analytics, USA
2018 Werner von Siemens Award
Since 2018 Guest scientist at Friedrich–Alexander University Erlangen–Nürnberg, Germany
2016 Gold Medal at International Exhibition of Technical Innovations, Patents, and Inventions INVENT ARENA, Třinec, Czech Republic
2015 Olomouc City Award 2014 in the field of science and research
2011 Prize of the Czech Republic's Minister of Education for extraordinary results achieved in the field of research, experimental development and innovations.

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

Numbers of completed PhDs and postdocs

2006–2021 ca 40 postdocs/ 20 PhD students, Palacký University Olomouc, the Czech Republic

TEACHING ACTIVITIES

1998–2021 Masters/Bachelors: Courses *Materials Chemistry*, *Nanomaterials Chemistry*, and *Nuclear Chemistry*, Dept. of Physical Chemistry, Palacký University Olomouc, the Czech Republic

ORGANISATION OF SCIENTIFIC MEETINGS (Selection)

Over 20 national and international conferences and workshops. Since 2012, the Chairman of Nanocon—one of the largest conferences in the field of nanotechnologies in the Central European region (https://www.nanocon.eu/en//). Since 2014, the Chairman of the prestigious Zahradník lecture series hosting world-recognized speakers (https://www.rcptm.com/lectures/). Selected events chaired/co-organized/ between 2017 and 2021:

2021 Nanocon 2021, ca 300 participants, Brno, the Czech Republic
2020 Workshop on Low-Dimensional Materials, Liblice, the Czech Republic

2019 Zahradník Lecture Series, ca 100 participants, Olomouc, the Czech Republic
2019 Nanocon 2019, ca 300 participants, Brno, the Czech Republic
2018 The US–Czech Conference on Advanced Nanotechnology and Chemistry under the auspices of the US Ambassador, Mr. Stephen B. King (https://cz.usembassy.gov/ambassador-king-opens-u-s-czech-conference-advanced-nanotechnology-chemistry/)
2018 Nanocon 2018, over 300 participants, Brno, the Czech Republic
2017 Zahradník Lecture Series, ca 100 participants, Olomouc, the Czech Republic

INSTITUTIONAL RESPONSIBILITIES (Selection)

since 2021 Member of the Scientific Board of VSB-Technical University Ostrava
2014–2021 Member of the Scientific Board of Palacký University Olomouc
2010–2019 Member of the Scientific Board of the Faculty of Science, Palacký University Olomouc
2012–2019 The Director of the Competence Centre of the Technology Agency of the Czech Republic (www.nanobiowat.com).

COMMISSIONS OF TRUST

Reviewing for Journals (Selection)

Science, JACS, Angew. Chem., Advanced Materials, ACS Nano, Nature Nanotechnology, Nature Chemistry, Nature Materials, Nature Communications.

Editorships (Selection)

Member of the Editorial Boards of several journals, e.g., *Applied Materials Today* (Elsevier, since 2018), *Scientific Reports* (Springer Nature, 2016–2020), *View* (Wiley, since 2020).

Reviewing funding proposals (Selection)

Reviewing proposals of European Union grants (ERC grants) or grants of the Technology Agency of the Czech Republic.

MEMBERSHIPS IN SCIENTIFIC SOCIETIES (Selection)

2015–2020 Elected member of the Learned Society of the Czech Republic
2015–2019 Member of the Scientific Board for chemistry of the Neuron Endowment Fund
2016–2019 Member of the Scientific Board of Central European Institute of Technology, Masaryk University in Brno
2013–2016 Member of the Scientific Board of the West-Bohemian Centre of Materials and Metallurgy, COMTES FHT, Pilsen
2012–2014 Member of the Scientific Board of the Technology Agency of the Czech Republic (Alfa Programme)

MAJOR RESEARCH COLLABORATIONS (Selection—recent and ongoing)

Prof. Paolo Fornasiero, University of Trieste, Italy, nanocatalysis, electrocatalysis and plasmonics.

Prof. Matthias Beller, University of Rostock, Germany, nanocatalysis and single atom catalysis

Prof. Patrik Schmuki, University of Erlangen (FAU), Germany, metal oxides for photocatalysis and direct solar splitting of water

Prof. Andrey Rogach, City University of Hong Kong, photoluminescence nanoparticles and quantum dots

Prof. Rajender Varma, US EPA, USA, green chemistry and heterogeneous catalysis

Prof. Roland Fischer, Technical University Munich, Germany, MOF-derived and carbon-based materials for energy- and environmental technologies

Prof. Emmanuel Giannelis, Cornell University, USA, carbon-based nanostructures

Prof. Vasilios Georgakilas, University of Patras, Greece, graphene derivatives

Dr. Kevin Sivula, EPFL Lausanne, Switzerland, BMCs and metal oxides for photoelectrocatalysis

Prof. Kwang S. Kim, Ulsan National Institute of Science & Technology, South Korea, covalent and non-covalent functionalization of graphene

Prof. Virender K. Sharma, University of Texas, USA, nanomaterials for water treatment

RESEARCH PROFILE

My scientific focus relates to the development of new low-dimensional nanomaterials including carbon quantum dots, fullerene, graphene and its derivatives, metal organic frameworks, and metal-based nanosystems, which possess exceptional magnetic, photoluminescence, plasmonic, catalytic and energy-related (harvesting/storage)

properties. With my team, I have succeeded in applying these materials in biomedicine, water treatment, catalysis, energy, and environmental technologies, with other application strategies being developed.
Examples of my main achievements include the development of the world's thinnest insulator based on fluorographene (*Small* **2010**), room temperature organic magnets based on functionalized graphene (*Nature Communications* **2018**), and the first two-dimensional carboxylic acid named *graphene acid* (*ACS Nano* **2017**). Furthermore, my team contributed to, for example, the discovery of the mechanism behind the bacterial resistance to silver nanoparticles, including a way to overcome it (*Nature Nanotechnology* 2019), the development of 1D non-metallic conductors (*Nature Nanotechnology* 2020), and the first iron-based heterogeneous catalyst for hydrogenation of nitriles (*Nature Catalysis* 2021).
I have also contributed to the development of numerous technologies that have been successfully implemented in the fields of water treatment and biotechnologies (e.g., EP 2 873 329, EP 3 585 736 and EP 2 164 656). Among others, the technology for the large-scale production of iron nanoparticles is successfully applied by NANO IRON, s.r.o., (https://nanoiron.cz/en/) in areas of groundwater treatment in Europe, US, and Asia; or the technology for the separation of antiviral and antimicrobial lactoferrin protein from the milk medium has been licensed to companies in the Czech Republic (Lactofirm) and Poland (Ferilac).

RESEARCH OUTPUT (updated in November 2021)

- Over 550 papers in international peer-reviewed journals, the full list of publications: https://www.rcptm.com/about/personnel/radek-zboril/#publications
- H-index (Google Scholar): 99; H-index (Web of Science): 86
- Over 48 000 citations (Google Scholar); over 37 000 (Web of Science)
- Web of Science: *Highly Cited Researcher 2018–2021* (among the top 1% of researchers with most cited documents in a specific field)
- Google Scholar.:
  Top 10 scientists in *Water Treatment*
  https://scholar.google.com/citations?view_op=search_authors&hl=en&mauthors=label:water_treatment
  Top 20 scientists in *Energy*
  https://scholar.google.com/citations?view_op=search_authors&hl=en&mauthors=label:energy&after_author=s55VAPPh_v8J&astart=10
  Top 50 scientists in *Catalysis*
  https://scholar.google.com/citations?view_op=search_authors&hl=en&mauthors=label:catalysis&after_author=ORuHAKdA__8J&astart=30
  Top 50 scientists in *Nanotechnology*
  https://scholar.google.com/citations?view_op=search_authors&hl=en&mauthors=label:nanotechnology&after_author=csICAIIn__8J&astart=40

REPRESENTATIVE PUBLICATIONS—10 SELECTED

1. Vishwas, G; Senthamarai, T.; Kadam, R.; Malina, O.; Kašlík, J.; **Zbořil, R*.**; Gawande, M. B.; Jagadeesh R. V.; Beller, M., "A unique combination of silica supported Fe/Fe-O nanoparticles and aluminum additives for catalytic hydrogenation of all kinds of nitriles to amines*",* NATURE CATALYSIS, in press, 2021. IF=41.813
2. B. Cirera, A. Sánchez-Grande, B. de la Torre, J. Santos, S. Edalatmanesh, E. Rodriguez-Sánchez, K. Lauwaet, B. Mallada, **R. Zbořil**, R. Miranda, O. Gröning, P. Jelinek, N. Martin, and D. Ecija, "Tailoring topological order and π-conjugation to engineer quasi-metallic polymers," NATURE NANOTECHNOLOGY, vol. 15, p. 437–443, 2020. IF=39.213
3. A. Bakandritsos, R. G. Kadam, P. Kumar, G. Zoppellaro, M. Medveď, J. Tuček, T. Montini, O. Tomanec, P. Andrýsková, B. Drahoš, R. S. Varma, M. Otyepka, M. B. Gawande, P. Fornasiero, and **R. Zbořil***, "Mixed-Valence Single-Atom Catalyst Derived from Functionalized Graphene," ADVANCED MATERIALS, vol. 31, iss. 17, p. 1900323, 2019. IF=30.849
4. A. Panácek, L. Kvítek, M. Smékalová, R. Vecerová, M. Kolár, M. Röderová, F. Dycka, M. Sebela, R. Prucek, O. Tomanec, and **R. Zboril***, "Bacterial resistance to silver nanoparticles and how to overcome it," NATURE NANOTECHNOLOGY, vol. 13, iss. 1, pp. 65–71, 2018. IF=39.213
5. B. de la Torre, M. Svec, P. Hapala, J. Redondo, O. Krejčí, R. Lo, D. Manna, A. Sarmah, D. Nachtigallová, J. Tucek, P. Blonski, M. Otyepka, **R. Zboril***, P. Hobza, and P. Jelínek, "Non-covalent control of spin-state in metal-organic complex by positioning on N-doped graphene," NATURE COMMUNICATIONS, vol. 9, iss. 1, p. 2831, 2018. IF=14.919
6. A. Bakandritsos, M. Pykal, P. Blonski, P. Jakubec, D. D. Chronopoulos, K. Polakova, V. Georgakilas, K. Čépe, O. Tomanec, V. Ranc, A. B. Bourlinos, **R. Zboril***, and M. Otyepka, "Cyanographene and Graphene

Acid: Emerging Derivatives Enabling High-Yield and Selective Functionalization of Graphene," ACS NANO, vol. 11, iss. 3, pp. 2982–2991, 2017. IF=18.881

7. P. Blonski, J. Tucek, Z. Sofer, V. Mazánek, M. Petr, M. Pumera, M. Otyepka, and **R. Zboril***, "Doping with Graphitic Nitrogen Triggers Ferromagnetism in Graphene," JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 139, iss. 8, pp. 3171–3180, 2017. IF = 15.419.
8. S. Kment, F. Riboni, S. Pausova, L. Wang, L. Wang, H. Han, Z. Hubicka, J. Krysa, P. Schmuki, and **R. Zboril***, "Photoanodes based on TiO_2 and α-Fe_2O_3 for solar water splitting - superior role of 1D nanoarchitectures and of combined heterostructures," CHEM. SOC. REV., vol. 46, iss. 12, pp. 3176–3769, 2017. IF=54.564
9. J. Tucek, K. Hola, A. B. Bourlinos, P. Blonski, A. Bakandritsos, J. Ugolotti, M. Dubecky, F. Karlicky, V. Ranc, K. Cepe, M. Otyepka, and **R. Zboril***, "Room temperature organic magnets derived from sp3 functionalized graphene," NATURE COMMUNICATIONS, vol. 8, p. 14525, 2017. IF=14.919
10. V. Georgakilas, M. Otyepka, A. B. Bourlinos, V. Chandra, N. Kim, C. K. Kemp, P. Hobza, **R. Zboril***, and K. S. Kim, "Functionalization of Graphene: Covalent and Non-Covalent Approaches, Derivatives and Applications," CHEMICAL REVIEWS, vol. 112, iss. 11, pp. 6156–6214, 2012. IF=60.622

RESEARCH MONOGRAPHS AND CHAPTERS IN COLLECTIVE VOLUMES (SELECTION)

Together with colleagues, I have edited several books and contributed to several Chapters in books on various aspects of nanotechnologies. Selected examples:

- Filip J., Cajthaml T, Najmanová P., Černík M., **Zboril R.** (Editors). *Advanced nano-bio technologies for water and soil treatment*, Springer GmbH, **2020**.
- Datta K.K.R., Reddy B.V.S., **Zboril R.**, *Polysaccharides as functional scaffolds for noble metal nanoparticles and their catalytic applications*, edited by H. S. Nalwa, American Scientific Publishers, Encyclopedia of Nanoscience and Nanotechnology, volume 29: pp. 439–458, **2018.**
- Sharma V.K. and **Zboril R**.: *Silver Nanoparticles in Natural Environment: Formation, Fate, and Toxicity, in: Bioactivity of Engineered Nanoparticles*, edited by B. Yan, H. Zhou and J. L. Gardea Torresdey, Springer Nature, Singapore, Chapter 10, **2017**.
- Rathi A.K., Zboril, R., Varma, R.S., Gawande M.B., *Magnetite (Ferites)-Supported Nano-Catalysts: Sustainable Applications in Organic Transformations*, in: Ferrites and Ferrates: Chemistry and Applications in Sustainable Energy and Environmental Remediation, American Chemical Society, Washington DC, Chapter 2, pp. 39–78, **2016.**
- Datta K.K.R. and **Zboril R**: *Halogenated Graphenes: Emerging Family of Two Dimensional Materials*, edited by V. Georgakilas, Wiley-VCH Verlag GmbH & Co. KGaA, pp. 173–198, **2014**.

PLENARY/INVITED TALKS (SELECTION)

- *Global Summit and Expo on Graphene and 2D Materials (2DMAT2021)* in Paris, France, August 23–25, 2021 (plenary talk together with prof. Konstantin Novoselov, Nobel Laureate in Physics 2010)
- *8th edition of the largest European Conference & Exhibition in Graphene and 2D Materials (GRAPHENE 2018)*, Dresden, Germany, June 26–29, 2018.
- *IV. Mediterranean Thematic Workshop in Advanced Molecular Imaging (MEDAMI 2016)*, Ajaccio, Corsica, May 1–5, 2016.
- *International Scientific Conference on Nanomaterials & Applications (NANOAPP),* Portoroz, Slovenia, September 22–26, 2013.
- *4th International Conference from Nanoparticles and Nanomaterials to Nanodevices and Nanosystems (IC4N),* Corfu, Greece, June 16–20, 2013 (keynote talk together with prof. Daniel Shechtman, Nobel Laureate in Chemistry 2011)

GRADUATE STUDENT AND POSTDOC SUPERVISION

Over 30 of my former PhDs and Postdoctoral fellows received prestigious academic positions or positions in industry in Europe, USA and Asia. Some Examples are Manoj B. Gawande (Assoc. prof. at Institute of Chemical Technology, Mumbai, India), Jayaramulu Kolleboyina (Assistant Professor, Head of the Department, Department of Chemistry, Indian Institute of Technology Jammu, J&K), Dr. Jason A. Perman (University of South Florida, USA), Anandrup Goswami (Associate Professor at Vignan Institute of Technology & Sciences, India), KKR Datta (Research Assistant Professor, Chemistry Department, SRM Institute of Science and Technology, Chennai, India), (Dr. Hyungkyu Han, Pacific Northwest National Laboratory, USA), Dr. Audrey Mokdad (lecturer, Unity College, USA), Dr. Panagiotis Dallas (Research Associate, Cornell University, USA), Dr. Eleni Petala (the project leader, The Foundation for Research and Technology – Hellas, Greece), Dr. Seyedsina Hejazi (University

of Siegen, Germany), Dr. Kateřina Holá (Uppsala University, Sweden), or Verónica Gómez Piedrafita (Badrinas, s.a.u., Spain).

GRANTS

Principal investigator (PI) or co-PI of grant projects with subsidy for Palacky University Olomouc (UP) over 75 mil. EUR

Selected grants solved as PI/co-PI

Project Title	***Funding source***	***Amount (Euros)***	***Period***	***Role***
Control of electronic properties of metal-containing molecules through their noncovalent interactions with solvents, ligands and 2D nanosystems	Czech Science Foundation (GAČR), call EXPRO	1.1 million	2019 - 2023	project co-leader
Nanotechnologies for Future	ESF/Ministry of Education, Youth and Sports CZ, call: Operational programme OPVVV, "Excellent Research"	13 million	2018 - 2022	project leader
Advanced Hybrid Nanostructures for Renewable Energy Applications	ESF/Ministry of Education, Youth and Sports CZ, call: Operational programme OPVVV, "Excellent Teams"	5 million	2017 - 2022	project leader
Environmentally friendly nanotechnologies and biotechnologies in water and soil treatment (NANOBIOWAT)	Technology Agency of the Czech Republic (TAČR), call: Centres of Competence	11.7 million	2012-2019	project leader
Development of Regional Centre of Advanced Technologies and Materials	Ministry of Education, Youth and Sports CZ, call: National Programme of Sustainability	21 million	2014-2019	project leader
Centre for environment friendly high effective polymer antimicrobial agents for industrial applications, (ALTERBIO)	Technology Agency of the Czech Republic (TAČR), call: Centres of Competence	650 000 (UP budget)	2014-2019	leader of the team at UP
Taking Nanotechnological Remediation Processes from Lab Scale to End User Applications for the Restoration of a Clean Environment (NANOREM)	EU: FP7- NMP	274 000 (UP budget)	2013-2017	leader of the team at UP
Regional Centre of Advanced Technologies and Materials	ERDF/ Ministry of Education, Youth and Sports CZ, call: Operational programme OP VaVpI	20.1 million	2010-2014	project leader
Development of the research team of the Regional Centre of Advanced Technologies and Materials and its involvement in international networks and projects	ERDF/ Ministry of Education, Youth and Sports CZ, call: Operational programme OPVK	1.5 million	2011-2014	project leader
Research team of the Regional Centre of Advanced Technologies and Materials with a focus on unconventional experimental techniques in materials and optical research	ERDF/ Ministry of Education, Youth and Sports CZ, call: Operational programme OPVK	835 000	2012-2015	project leader
Nanomaterials and nanotechnologies for environmental protection and a sustainable future	Ministry of Education, Youth and Sports CZ, call: Large Research Infrastructures	603 000 (UP budget)	2016-2019	leader of the team at UP