

# CURRICULUM VITAE

## Matvey Fedin



### Head of Laboratory of Magnetic Resonance

International Tomography Center,  
Laboratory of Magnetic Resonance,  
Institutskaya str., 3a,  
Novosibirsk, 630090, Russian Federation

Phone: +7 383 3301276

Fax: +7 383 3331399

E-mail: [mfedin@tomo.nsc.ru](mailto:mfedin@tomo.nsc.ru)

Web: <http://www.tomo.nsc.ru/homepages/LMR/Fedin/>

### Born:

1977, 11<sup>th</sup> of March, Alma-Ata, Kazakhstan

### Research Interests:

Methodology and applications in magnetic resonance:

new methods in EPR for solids and liquids  
exchange-coupled clusters, molecular magnetism, photomagnetism  
nitroxides, free radicals, micellized radicals, biradicals  
new techniques based on magnetic and spin effects in radical reactions in liquids  
spin relaxation in low and high magnetic fields

### Keywords and expertise:

Chemical Physics, Physical Chemistry, Spectroscopy, Electron Paramagnetic Resonance (EPR), advanced pulse and continuous wave EPR techniques, nitroxides, molecular magnetism, exchange-coupled clusters, multiple-photon resonances in EPR, disordered solids, magnetic and spin phenomena, spin polarization and spin relaxation of radicals, spin dynamics of radicals in low and high magnetic fields, photochemistry, spin chemistry

### Education and degrees:

October 2010	Doctor of sciences (Habilitation analogue)	“Novel EPR methods and approaches in study of spin dynamics of radicals, transition metal ions and heterospin molecular magnets”
March 2002	Ph. D. in chemical physics	“Spin polarization and relaxation of short-lived radicals in low magnetic fields” (supervisors Prof. Elena Bagryanskaya and Prof. Peter Purtoev)
June 2000	Masters degree in chemical	“Investigation of the photochemical reactions in homogeneous solution by the method of SEMF

	and biological physics	CIDNP” (supervisor Prof. Elena Bagryanskaya)
June 1998	Bachelor degree in chemical and biological physics	“Investigation of micellized radical pairs by the method of SEMF CIDNP” (supervisor Prof. Elena Bagryanskaya)

## Work experience:

05/2012-...	Leader of Laboratory of Magnetic Resonance, ITC Novosibirsk
10/2013-11/2013	Visiting scientist in Osaka City University (JSPS short-term professorship level fellowship)
12/2010-04/2012	Leading researcher in ITC Novosibirsk (Laboratory of Magnetic Resonance, Prof. Elena Bagryanskaya)
12/2007-5/2008	Visiting scientist at MPI for Bioinorganic Chemistry, Muelheim/Ruhr (Humboldt foundation research fellowship, Prof. Wolfgang Lubitz)
5/2006-7/2006	Visiting scientist at ETH Zurich (Dr. Igor Gromov)
7/2005-9/2005	Visiting scientist at ETH Zurich (Prof. Arthur Schweiger)
10/2004-11/2010	Senior researcher in ITC Novosibirsk (Laboratory of Magnetic and Spin Phenomena, Prof. Elena Bagryanskaya)
08/2002-09/2004	Postdoctoral fellow at ETH Zurich (Laboratory of Physical Chemistry, Prof. Arthur Schweiger)
03/2002-08/2002	Postdoctoral fellow in ITC Novosibirsk
06/2000-03/2002	Ph.D. studies in ITC Novosibirsk
01/1997-06/2000	Novosibirsk State University and International Tomography Center (ITC) (Laboratory of Magnetic and Spin Phenomena, Prof. Elena Bagryanskaya)

## Languages:

English (fluent), German (basic), Russian (native).

## Grants and Awards:

1. Grant of Russian Science Foundation, 2014-2016.
2. Grant of the Council at the President of Russian Federation, 2014-2015.
3. Leader of group project of Russian Foundation for Basic Research, 2014-2016.
4. Fellowship of Japan Society for Promotion of Science (JSPS), professorship level, 2013.
5. Voevodsky young scientist prize of SB RAS in chemical physics, 2011.
6. Leader of group project of Russian Foundation for Basic Research, 2011-2013.
7. Grant of the Council at the President of Russian Federation, 2010-2011.
8. Leader of group project of Russian Foundation for Basic Research, 2008-2010.
9. Grant of the Council at the President of Russian Federation, 2008-2009.
10. Alexander von Humboldt research fellowship, 2007.
11. Award of Presidium SB RAS “for the achievements in scientific research and on the occasion of 50<sup>th</sup> anniversary of SB RAS”, March 2007.
12. Asia-Pacific EPR/ESR Society award for the organization of 5th APES Symposium in Novosibirsk Scientific Center, 24-27 August, 2006.
13. Participation award for the 18<sup>th</sup> Meeting of Nobel Prize Winners in Chemistry at Lindau, Lake Constance, Germany, June 25-30, 2006.
14. 1<sup>st</sup> postdoctoral poster prize at International Conference on Molecule-Based Magnets, Victoria BC, Canada, 2006
15. Lavrentiev award of SB RAS, Leader of a group project, 2006
16. Grant of the Council at the President of Russian Federation, 2006-2007.

17. Leader of group project of Russian Foundation for Basic Research, 2005-2007
18. INTAS Young Scientist Fellowship award 2005-2006.

## Publications:

1. **M. V. Fedin**, S. L. Veber, E. G. Bagryanskaya, V. I. Ovcharenko // Electron paramagnetic resonance of switchable copper-nitroxide-based molecular magnets: An indispensable tool for intriguing systems // *Coord. Chem. Rev.* 289–290 (2015) 341-356.
2. M. A. Nasalevich, R. Becker, E. V. Ramos-Fernandez, S. Castellanos, S. L. Veber, **M. V. Fedin**, F. Kapteijn, J. N. H. Reek, J. I. van der Vlugt and J. Gascon // Co@NH<sub>2</sub>-MIL-125(Ti): cobaloxime-derived metal-organic framework-based composite for light-driven H<sub>2</sub> production // *En. Environ. Sci.* 8 (2015) 364-375.
3. I. Yu. Barskaya, S. L. Veber, S. V. Fokin, E. V. Tretyakov, E. G. Bagryanskaya, V. I. Ovcharenko, M. V. Fedin // Structural specifics of light-induced metastable states in copper(II)–nitroxide molecular magnets // *Dalton Trans.* 44 (2015) 20883-20888.
4. A. A. Malygin, D. M. Graifer, M. I. Meschaninova, A. G. Venyaminova, O. A. Krumkacheva, M. V. Fedin, G. G. Karpova, E. G. Bagryanskaya // Doubly spin-labeled RNA as an EPR reporter for studying arrangement of multicomponent supramolecular assemblies // *Biophys. J.* 109 (2015) 2637–2643.
5. S. L. Veber, E. A. Sutura, **M. V. Fedin**, K. N. Boldyrev, K. Y. Maryunina, R. Z. Sagdeev, V. I. Ovcharenko, N. P. Gritsan, E. G. Bagryanskaya // FTIR Study of Thermally Induced Magnetostructural Transitions in Breathing Crystals // *Inorg. Chem.* 54 (2015) 3446-3455.
6. J. Jung, B. Le Guennic, **M. V. Fedin**, V. I. Ovcharenko, C. J. Calzado // Mechanism of Magnetostructural Transitions in Copper-Nitroxide-Based Switchable Molecular Magnets: Insights from ab Initio Quantum Chemistry Calculations // *Inorg. Chem.* 54 (2015) 6891-6899.
7. **M. V. Fedin**, S. L. Veber, E. G. Bagryanskaya, G. V. Romanenko, V. I. Ovcharenko // Spatial distribution of phases during gradual magnetostructural transitions in copper(II)–nitroxide based molecular magnets // *Dalton Trans.* 44 (2015) 18823-18830.
8. A. A. Kuzhelev, D. V. Trukhin, O. A. Krumkacheva, R. K. Strizhakov, O. Yu. Rogozhnikova, T. I. Troitskaya, **M. V. Fedin**, V. M. Tormyshev, E. G. Bagryanskaya // Room-Temperature Electron Spin Relaxation of Triarylmethyl Radicals at the X- and Q- Bands // *J. Phys. Chem. B* 119 (2015) 13630–13640.
9. G. Yu. Shevelev, O. A. Krumkacheva, A. A. Lomzov, A. A. Kuzhelev, D. V. Trukhin, O. Yu. Rogozhnikova, V. M. Tormyshev, D. V. Pyshnyi, **M. V. Fedin**, E. G. Bagryanskaya // Triarylmethyl Labels: Toward Improving the Accuracy of EPR Nanoscale Distance Measurements in DNAs // *J. Phys. Chem. B* 119 (2015) 13641–13648
10. M. Yu. Ivanov, S. L. Veber, S. A. Prikhod'ko, N. Yu. Adonin, E. G. Bagryanskaya, **M. V. Fedin** // Probing Microenvironment in Ionic Liquids by Time-Resolved EPR of Photoexcited Triplets // *J. Phys. Chem. B* 119 (2015) 13440–13449.
11. E. G. Bagryanskaya, O. A. Krumkacheva, **M. V. Fedin**, S. R.A. Marque // Development and Application of Spin Traps, Spin Probes, and Spin Labels // *Methods in Enzymology* 563 (2015) 365-396.

12. S. E. Tolstikov, N. A. Artiukhova, G. V. Romanenko, A. S. Bogomyakov, E. M. Zueva, I. Yu. Barskaya, **M. V. Fedin**, K. Yu. Maryunina, E. V. Tretyakov, R. Z. Sagdeev, V. I. Ovcharenko // Heterospin complex showing spin transition at room temperature // *Polyhedron* 100 (2015) 132-138.
13. E. V. Tretyakov, G. V. Romanenko, S. L. Veber, **M. V. Fedin**, A. V. Polushkin, A. O. Tkacheva, V. I. Ovcharenko //  $\text{Cu}(\text{hfac})_2$  Complexes with Nitronyl Ketones Structurally Mimicking Nitronyl Nitroxides in Breathing Crystals // *Aust. J. Chem.* 68 (2015) 970-980.
14. A. M. Sheveleva, I. K. Shundrina, S. L. Veber, A. D. Buhtjarova, V. V. Russkih, V. V. Shelkovnikov, **M. V. Fedin**, E. G. Bagryanskaya // Inherent Microporosity and Photostability of Fluoroacrylic Polymer Films Studied by Electron Paramagnetic Resonance of Nitroxide Spin Probes // *Appl. Magn. Reson.* 46 (2015) 523-540.
15. W. Kaszub, A. Marino, M. Lorenc, E. Collet, E. G. Bagryanskaya, E. V. Tretyakov, V. I. Ovcharenko, **M. V. Fedin** // Ultrafast Photoswitching in a Copper-Nitroxide-Based Molecular Magnet // *Angew. Chem. Int. Ed.* 53 (2014) 10636-10640.
16. G.Yu. Shevelev, O.A. Krumkacheva, A.A. Kuzhelev, A.A. Lomzov, O.Yu. Rogozhnikova, D.V. Trukhin, T.I. Troitskaya, V.M. Tormyshev, **M.V. Fedin**, D.V. Pyshnyi, E.G. Bagryanskaya // Physiological-Temperature Distance Measurement in Nucleic Acid using Triarylmethyl-Based Spin Labels and Pulsed Dipolar EPR Spectroscopy // *J. Amer. Chem. Soc.* 136 (2014) 9874–9877.
17. I. Yu. Barskaya, E. V. Tretyakov, R. Z. Sagdeev, V. I. Ovcharenko, E. G. Bagryanskaya, K. Yu. Maryunina, T. Takui, K. Sato, **M. V. Fedin** // Photoswitching of a Thermally Unswitchable Molecular Magnet  $\text{Cu}(\text{hfac})_2\text{L}^{\text{i-Pr}}$  Evidenced by Steady-State and Time-Resolved Electron Paramagnetic Resonance // *J. Amer. Chem. Soc.* 136 (2014) 10132–10138.
18. R. K. Strizhakov, E. V. Tretyakov, A. S. Medvedeva, V. V. Novokshonov, V. G. Vasiliev, V. I. Ovcharenko, O. A. Krumkacheva, **M. V. Fedin**, E. G. Bagryanskaya // Permethyln-b-Cyclodextrin Spin-Labeled with Nitronyl Nitroxide: Synthesis and EPR Study // *Appl. Magn. Reson.* 45 (2014) 1087-1098.
19. E. S. Babaylova, A. V. Ivanov, A. A. Malygin, M. A. Vorobjeva, A. G. Venyaminova, Y. F. Polienko, I. A. Kirilyuk, O. A. Krumkacheva, **M. V. Fedin**, G. G. Karpova, E. G. Bagryanskaya. A versatile approach for site-directed spin labeling and structural EPR studies of RNAs // *Org. Biomol. Chem.* 12 (2014) 3129-3136. (IF=3.568)
20. S. Tolstikov, E. Tretyakov, S. Fokin, E. Suturina, G. Romanenko, A. Bogomyakov, D. Stass, A. Maryasov, **M. Fedin**, N. Gritsan, V. Ovcharenko //  $\text{C}(\text{sp}^2)$ -Coupled Nitronyl and Imino Nitroxide Diradicals // *Chem. Eur. J.* 20 (2014) 2793-2803. (IF=5.831)
21. A. M. Sheveleva, D. I. Kolokolov, A. A. Gabrienko, A. G. Stepanov, S. A. Gromilov, I. K. Shundrina, R. Z. Sagdeev, **M. V. Fedin**, E. G. Bagryanskaya. Structural Dynamics in “Breathing” Metal-Organic Framework Studied by Electron Paramagnetic Resonance of Nitroxide Spin Probes // *J. Phys. Chem. Lett.* 5 (2014) 20-24. (IF=6.585)
22. V. V. Novikov, I. V. Ananyev, A. A. Pavlov, **M. V. Fedin**, K. A. Lyssenko, Y. Z. Voloshin. Spin-Crossover Anticooperativity Induced by Weak Intermolecular Interactions // *J. Phys. Chem. Lett.* 5 (2014) 496–500. (IF=6.585)

23. O. A. Krunkacheva, **M. V. Fedin**, D. N. Polovyanenko, L. Jicsinszky, S. R. A. Marque, E. G. Bagryanskaya. Structural Equilibrium in New Nitroxide-Capped Cyclodextrins: CW and Pulse EPR Study // *J. Phys. Chem. B* 117 (2013) 8223-8231. (IF=3.607)
24. I. Yu. Drozdyuk, S. E. Tolstikov, E. V. Tretyakov, S. L. Veber, V. I. Ovcharenko, R. Z. Sagdeev, E. G. Bagryanskaya, **M. V. Fedin** // Light-Induced Magnetostructural Anomalies in a Polymer Chain Complex of Cu(hfac)<sub>2</sub> with tert-Butylpyrazolyl nitroxides // *J. Phys. Chem. A* 117 (2013) 6483-6488. (IF=2.771)
25. S. L. Veber, **M. V. Fedin**, K. Yu. Maryunina, K. N. Boldyrev, M. A. Sheglov, V. V. Kubarev, O. A. Shevchenko, N. A. Vinokurov, G. N. Kulipanov, R. Z. Sagdeev, V. I. Ovcharenko, E. G. Bagryanskaya // Influence of Intense THz Radiation on Spin State of Photoswitchable Compound Cu(hfac)<sub>2</sub>L<sup>Pr</sup> // *J. Phys. Chem. A* 117 (2013) 1483-1491. (IF=2.771)
26. I. Yu. Drozdyuk, K. Yu. Maryunina, R. Z. Sagdeev, V. I. Ovcharenko, E. G. Bagryanskaya, **M. V. Fedin** // Topology of exchange interactions in copper-nitroxide based molecular magnets studied by EPR // *Mol. Phys.* 111 (2013) 2903-2907. (IF=1.670)
27. E. V. Tretyakov, V. G. Vasil'ev, A. S. Bogomyakov, G. V. Romanenko, **M. V. Fedin**, I. S. Antipin, S. E. Solov'eva, A. I. Konovalov, R. Z. Sagdeev, V. I. Ovcharenko // Synthesis, structure, and properties of nitronyl nitroxyl tetradical with calix[4]arene framework // *Russ. Chem. Bull.* 62 (2013) 543-547. (IF=0.423)
28. Zhilina, E. F.; Chizhov, D. L.; Sidorov, A. A.; Aleksandrov, G. G.; Kiskin, M. A.; Slepukhin, P. A.; **Fedin, M. V.**; Starichenko, D. V.; Korolev, A. V.; Shvachko, Y. N.; Eremenko, I. L.; Charushin, V. N. Neutral tetranuclear Cu(II) complex of 2,6-di(5-trifluoromethylpyrazol-3-yl)pyridine: Synthesis, characterization and its transformation with selected aza-ligands // *Polyhedron* 53 (2013) 122-131
29. Belov, A. S.; Dolganov, A. V.; Novikov, V. V.; Vologzhanina, A. V.; **Fedin, M. V.**; Kuznetsov, E. V.; Bubnov, Y. N.; Voloshin, Y. Z. Template synthesis, structure and electropolymerization of the 2-thiopheneboron-capped cobalt(II) clathrochelates // *Inorg. Chem. Comm.* 29 (2013) 160-164.
30. Isaev, N. P.; **Fedin, M. V.**; Dzuba, S. A. X- and Q-Band Electron Spin Echo Study of Stochastic Molecular Librations of Spin Labels in Lipid Bilayers // *Appl. Magn. Reson.* 44 (2013) 133-142.
31. **Fedin, M. V.**; Zhilina, E. F.; Chizhov, D. L.; et al. Temperature-dependent zero-field splitting in a copper(II) dimer studied by EPR // *Dalton Transactions* 42 (2013) 4513-4521.
32. **\*Fedin, M. V.**; Bagryanskaya, E. G.; Matsuoka, H. et al. W-Band Time-Resolved Electron Paramagnetic Resonance Study of Light-Induced Spin Dynamics in Copper-Nitroxide-Based Switchable Molecular Magnets // *J. Amer. Chem. Soc.* 134 (2012) 16319-16326.
33. Tretyakov, E. V.; Tolstikov, S. E.; Suvorova, A. O.; Polushkin, A. V.; Romanenko, G. V.; Bogomyakov, A. S.; Veber, S. L.; **Fedin, M. V.**; Stass, D. V.; Reijerse, E.; Lubitz, W.; Zueva, E. M.; Ovcharenko, V. I. Crucial Role of Paramagnetic Ligands for Magnetostructural Anomalies in "Breathing Crystals" // *Inorg. Chem.* 51 (2012) 9385-9394.
34. Verkhovsky, M. I.; Bogachev, A. V.; Pivtsov, A. V.; Bertsova, Y. V.; **Fedin, M. V.**; Bloch, D. A.; Kulik, L. V. // Sodium-Dependent Movement of Covalently Bound FMN Residue(s) in Na<sup>+</sup>-Translocating NADH:Quinone Oxidoreductase // *Biochemistry* 51 (2012) 5414-5421.

35. \***M. V. Fedin**, K. Yu. Maryunina, R. Z. Sagdeev, V. I. Ovcharenko, E. G. Bagryanskaya. Self-Decelerating Relaxation of the Light-Induced Spin States in Molecular Magnets  $\text{Cu}(\text{hfac})_2\text{L}^{\text{R}}$  Studied by Electron Paramagnetic Resonance // *Inorg. Chem.* 51 (2012) 709-717.
36. O. Krumkacheva, M. Tanabe, S. Yamauchi, **M. Fedin**, S. R. A. Marque, E. Bagryanskaya. Time-Resolved and Pulse EPR Study of Triplet States of Alkylketones in  $\beta$ -Cyclodextrin // *Appl. Magn. Reson.* 42 (2012) 29-40.
37. S. L. Veber, **M. V. Fedin**, K. Yu. Maryunina, A. Potapov, ‡ D. Goldfarb, E. Reijerse, W. Lubitz, R. Z. Sagdeev, V. I. Ovcharenko, E. G. Bagryanskaya. Temperature-Dependent Exchange Interaction in Molecular Magnets  $\text{Cu}(\text{hfac})_2\text{LR}$  Studied by EPR: Methodology and Interpretations // *Inorg. Chem.* 50 (2011) 10204–10212.
38. A. V. Pivtsov, L. V. Kulik, N. V. Surovtsev, S. V. Adichtchev, I. A. Kirilyuk, I. A. Grigor'ev, **M. V. Fedin**, S. A. Dzuba. Temperature Dependence of Hyperfine Interaction for  $^{15}\text{N}$  Nitroxide in a Glassy Matrix at 10–210 K // *Appl. Magn. Reson.* 41 (2011) 411–429.
39. **M. V. Fedin**, I. Yu. Drozdyuk, E. V. Tretyakov, S. E. Tolstikov, V. I. Ovcharenko, E. G. Bagryanskaya. EPR of Spin Transitions in Complexes of  $\text{Cu}(\text{hfac})_2$  with tert-Butylpyrazolyl nitroxides // *Appl. Magn. Reson.* 41 (2011) 383–392.
40. N. P. Burkovskaya, E.V. Orlova, M.A. Kiskin, N.N. Efimov, A.S. Bogomyakov, **M.V. Fedin**, S.V. Kolotilov, V.V. Minin, G.G. Aleksandrov, A.A. Sidorov, V.I. Ovcharenko, V.M. Novotortsev, I.L. Eremenko. Synthesis, structure, and magnetic properties of heterometallic trinuclear complexes  $\{\text{M-II-Ln(III)-M-II}\}$  (M-II = Ni, Cu; Ln(III) = La, Pr, Sm, Eu, Gd) // *Russ. Chem. Bull.* 60 (2011) 2490-2503.
41. \***M. V. Fedin**, S. L. Veber, K. Yu. Maryunina, G. V. Romanenko, E. A. Sutura, N. P. Gritsan, R. Z. Sagdeev, V. I. Ovcharenko, E. G. Bagryanskaya. Intercluster Exchange Pathways in Polymer-Chain Molecular Magnets  $\text{Cu}(\text{hfac})_2\text{L}^{\text{R}}$  Unveiled by Electron Paramagnetic Resonance // *J. Amer. Chem. Soc.* 132 (2010) 13886-13891.
42. Voloshin Ya. Z., Varzatskii O. A., Novikov V. V., Strizhakova N. G., Vorontsov I. I., Vologzhanina A. V., Lyssenko K. A., Romanenko G. V., **Fedin M. V.**, Ovcharenko V. I., Bubnov Yu. N. // Tris-Dioximate Cobalt(I,II,III) Clathrochelates: Stabilization of Different Oxidation and Spin States of an Encapsulated Metal Ion by Ribbed Functionalization // *European Journal of Inorganic Chemistry* (2010) 5401–5415.
43. **M. V. Fedin**, S. L. Veber, R. Z. Sagdeev, V. I. Ovcharenko, E. G. Bagryanskaya. EPR spectroscopy of thermally induced and light induced spin transitions in heterospin exchange clusters of compounds  $\text{Cu}(\text{hfac})_2\text{L}^{\text{R}}$  // *Russ. Chem. Bull. Int. Ed.* 59 (2010) 1065-1079.
44. N. V. Zauzolkova, M. E. Nikiforova, A. A. Sidorov, I. A. Apolonskaya, **M. V. Fedin**, V. V. Minin, A. V. Rotov, E. A. Ugolkova, M. A. Kiskin, G. G. Aleksandrov, V. M. Novotortsev, I. L. Eremenko // Formation of polynuclear architectures with copper atoms and 1,1-cyclohexanediacetate anions // *Russ. Chem. Bull.* 59 (2010) 1186-1191.
45. I. Fomina, Z. Dobrokhotova, G. Aleksandrov, A. Bogomyakov, **M. Fedin**, A. Dolganov, T. Magdesieva, V. Novotortsev, I. Eremenko. Influence of the nature of organic components in dinuclear copper(II) pivalates on the composition of thermal decomposition products // *Polyhedron* 29 (2010) 1734–1746.
46. S. L. Veber, **M. V. Fedin**, S. V. Fokin, R. Z. Sagdeev, V. I. Ovcharenko, E. G. Bagryanskaya, “EPR study of Ligand Effects in Spin Triads of Bis(o-Semiquinonato)copper(II) Complexes” // *Appl. Magn. Reson.* 37 (2010) 693-701.



47. **M. Fedin**, V. Ovcharenko and E. Bagryanskaya, “EPR aiding the development of molecule-based magnetic devices”, in: “Electron Paramagnetic Resonance: From Fundamental Research to Pioneering Applications & Zavoisky Award”, ISBN 978-1-877524-01-1 coming out of print in June, 2010, p.122-123.
48. E. G. Bagryanskaya, D. N. Polovyanenko, **M. V. Fedin**, L. Kulik, A. Schnegg, A. Savitsky, K. Möbius, A. W. Coleman, G. S. Ananchenko and J. A. Ripmeester, “Multifrequency EPR study of the mobility of nitroxides in solid-state calixarene nanocapsules” // *Phys. Chem. Chem. Phys.* 11 (2009) 6700-6707.
49. **M. V. Fedin**, S. L. Veber, G. V. Romanenko, V. I. Ovcharenko, R. Z. Sagdeev, G. Klihm, E. Reijerse, W. Lubitz, E. G. Bagryanskaya “Dynamic mixing processes in spin triads of "breathing crystals" Cu(hfac)<sub>2</sub>LR: a multifrequency EPR study at 34, 122 and 244 GHz” // *Phys. Chem. Chem. Phys.* 11 (2009) 6654-6663.
50. \***Fedin, M.**, Ovcharenko, V., Sagdeev, R., Reijerse, E., Lubitz, W., Bagryanskaya, E. “Light-Induced Excited Spin State Trapping in an Exchange-Coupled Nitroxide-Copper(II)-Nitroxide Cluster.” *Angew. Chem. Int. Ed.* 47 (2008) 6897-6899; *Angew. Chem.* 120 (2008) 7003-7005.
51. Veber, S. L., **Fedin, M. V.**, Maryunina, K. Yu., Romanenko, G. V., Sagdeev, R. Z., Bagryanskaya, E. G., Ovcharenko, V. I. “Diamagnetic dilution due to the phase spin transition – An opportunity for the EPR study of intercluster exchange in “breathing” crystals of copper(II) hexafluoroacetylacetonate with pyrazole-substituted nitronyl nitroxide.” *Inorg. Chim. Acta* 361 (2008) 4148–4152.
52. \*Veber, S. L., **Fedin, M. V.**, Potapov, A. I., Maryunina, K. Yu., Romanenko, G. V., Sagdeev, R. Z., Ovcharenko, V. I., Goldfarb, D., Bagryanskaya, E. G. “High-Field EPR Reveals the Strongly Temperature-Dependent Exchange Interaction in “Breathing” Crystals Cu(hfac)<sub>2</sub>L<sup>R</sup>.” *J. Amer. Chem. Soc.* 130 (2008) 2444-2445.
53. \***Fedin, M. V.**, Veber, S. L., Gromov, I. A., Maryunina, K. Yu., Fokin, S. V., Romanenko, G. V., Ovcharenko, V. I., Sagdeev, R. Z., Bagryanskaya, E. G. “Thermally induced spin transitions in nitroxide-copper(II)-nitroxide spin triads studied by EPR.” *Inorg. Chem.* 46 (2007) 11405-11415.
54. Tretyakov, E. V., Tolstikov, S. E., Gorelik, E. V., **Fedin, M. V.**, Romanenko, G. V., Bogomyakov, A. S., Ovcharenko, V. I. “Copper(II) complexes with pyrazolyl-substituted nitronyl and imino nitroxides.” *Polyhedron* 27 (2008) 739–749.
55. \**Fedin, M. V.*, Veber, S. L., Gromov, I. A., Ovcharenko, V. I., Sagdeev, R. Z. and Bagryanskaya, E. G. “Electron spin exchange processes in strongly-coupled spin triads.” *J. Phys. Chem. A* 111 (2007) 4449-4455.
56. **Fedin, M.**, Gromov, I. and Schweiger, A. “Sensitivity optimization in Amplitude-Modulated CW-EPR experiment.” *J. Magn. Reson.* 182 (2006) 293–297.
57. Calle, C., Srekanth, A., **Fedin, M.**, Forrer, J., Garcia-Rubio, I., Gromov, I., Hinderberger, D., Kasumaj, B., Lager, P., Mancosu, B., Mitrikas, G., Santangelo, M. G., Stoll, S. Schweiger, A., Tschaggelar, R. and Harmer, J. “Pulse EPR Methods for Studying Chemical and Biological Samples Containing Transition Metals.” *Helv. Chim. Acta* 89 (2006) 2495-2521.
58. **Fedin, M.**, Shakirov, S., Purtov, P. and Bagryanskaya, E. “Electron spin relaxation of radicals in weak magnetic fields.” *Russ. Chem. Bull.* 10 (2006) 1642-1654 [translated into English in: *Russ. Chem. Bull. Int. Ed.* 10 (2006) 1703-1716].

59. \***Fedin, M. V.**, Veber, S. L., Gromov, I. A., Ovcharenko, V. I., Sagdeev, R. Z., Schweiger, A., and Bagryanskaya, E. G. "Electron Paramagnetic Resonance of three-spin nitroxide-copper(II)-nitroxide clusters coupled by a strong exchange interaction." *J. Phys. Chem. A* 110 (2006) 2315-2317.
60. Bagryanskaya, E., **Fedin, M.** and Forbes, M. D. E. "CIDEP of micellized radical pairs in low magnetic field." *J. Phys. Chem. A* 109 (2005) 5064-5069.
61. \***Fedin, M.**, Gromov, I. and Schweiger, A. "Absorption line CW EPR using an amplitude modulated longitudinal field." *J. Magn. Reson.* 171 (2004) 80-89.
62. Kälin, M., **Fedin, M.**, Gromov, I. and Schweiger, A. "Multiple-photon transitions in EPR spectroscopy." *Lecture Notes in Physics* 684 (2006) 143-183.
63. **Fedin, M.**, Kälin, M., Gromov, I. and Schweiger, A. "Applications of  $\pi$ -photon-induced transparency in two-frequency pulse electron paramagnetic resonance experiments." *J. Chem. Phys.* 120(3) (2004) 1361-1368.
64. Lebedeva, N. V., **Fedin, M. V.**, Bagryanskaya, E. G. and Sagdeev, R. Z. "The investigation of consecutive micellised radical pairs by the method of stimulated nuclear polarization." *Phys. Chem. Chem. Phys.* 5(12) (2003) 2595-2604.
65. \***Fedin, M. V.**, Purtov, P. A., Bagryanskaya, E. G. "Spin relaxation of radicals in low and zero magnetic field." *J. Chem. Phys.*, Vol.118, N 1 (2003) 192-201.
66. **Fedin, M. V.**, Bagryanskaya, E. G., Purtov, P. A., Makarov, T. N., Paul, H. "Theoretical and experimental studies of CIDNP kinetics in recombination of radical pairs by the method of switched external magnetic field. III. Free radicals in homogeneous solution." *J. Chem. Phys.*, Vol.117, N 13 (2002) 6148-6156.
67. **Fedin, M. V.**, Yashiro, H., Purtov, P. A., Bagryanskaya, E. G. and Forbes, M. D. E. "Theoretical and Experimental Studies of Chemically Induced Electron-Nuclear Polarization in Low Magnetic Fields." *Mol. Phys.*, Vol. 100, N 8, (2002) 1171-1180.
68. Bagryanskaya, E., Yashiro, H., **Fedin, M.**, Purtov, P. and Forbes, M. D. E. "Chemically Induced Multiplet Electron-Nuclear Polarization in Zero and Low Magnetic Fields." *J. Phys. Chem. A.*, Vol. 106, N 12 (2002) 2820-2828.
69. Bagryanskaya, E., Yashiro, H., **Fedin, M.**, Purtov P. and Forbes, M. D. E. "Chemically induced electron-nuclear spin polarization in zero and very low magnetic fields." *RIKEN review* 44 (2002) 116-118.
70. Bagryanskaya, E. G., Lebedeva, N. V., **Fedin, M. V.** and Sagdeev, R. Z. "Investigation of radical pairs in micelles using spin polarization techniques." *NATO Science Series, II: Mathematics, Physics and Chemistry* (2002), 76 (Magnetic Resonance in Colloid and Interface Science), 173-184.
71. **Fedin, M. V.**, Bagryanskaya, E. G., Purtov, P. A. "Anisotropic Hyperfine Interaction Induced Spin Relaxation in a Low Magnetic Field." *Chem. Phys. Lett.* Vol.339, N 5-6 (2001) 395-404.
72. **Fedin, M. V.**, Purtov, P. A., Bagryanskaya, E. G. "Theoretical and experimental studies of CIDNP kinetics in recombination of radical pairs by the method of Switched External Magnetic Field. II. Radical Pairs in Micelles." *J. Chem. Phys.*, Vol. 111, N 12 (1999) 5491-5502.



## Selected conference talks:

M. Fedin // Nitroxide-copper clusters as building blocks for thermo/photoswitchable nanomaterials // Pacificchem-2015, Honolulu, USA, 15-20 December 2015, Book of Abstracts (*invited talk*)

М. В. Федин // ЭПР в исследование термо- и фоточувствительных молекулярных материалов // Школа-конференция молодых ученых «Неорганические соединения и функциональные материалы» (ICFM-2015), Новосибирск, 5-9 октября 2015, Сборник тезисов, стр. 36. (*invited talk*)

Fedin M. V., Krumkacheva O. A., Shevelev G. Yu., Tormyshev V. M., Karpova G. G., Bagryanskaya E. G. // New Approaches for Distance Measurements in Nucleic Acids Using Nitroxyl and Trityl Spin Labels // 57th Rocky Mountain Conference on Magnetic Resonance, Snowbird, Utah, USA, July 26–31, 2015, Book of Abstracts, p. 36.

M. V. Fedin, S. L. Veber, E. G. Bagryanskaya, G. V. Romanenko, V. I. Ovcharenko // Accessing Spatial Distributions of Phases in Paramagnetic Solids by EPR: Application to Cu(hfac)<sub>2</sub>LR Family // The 9th Japanese-Russian Workshop on Open Shell Compounds and Molecular Spin Devices, Awaji, Japan, November 8-11, 2015, Book of Abstracts, p.35. (*invited talk*)

Fedin M. V., Barskaya I. Yu., Tretyakov E. V., Maryunina K. Yu., Ovcharenko V. I., Bagryanskaya E. G., Takui T., Sato K.. Photoswitching of thermally unswitchable copper-nitroxide based molecular magnet evidenced by steady-state and time-resolved EPR. EUROMAR 2014, Zurich, Switzerland, 29 June – 3 July 2014. p. PS275.

M. Fedin // Dynamics in Flexible Metal-Organic Polymers Studied by EPR // AvH supported workshop “Dynamics in Soft Matter Probed by Advanced EPR Techniques”, Zagreb, Croatia, 5-9 May 2014, p. 7 (*invited talk*)

Fedin M., Veber S., Drozdyuk I., Tretyakov E., Ovcharenko V., Sheveleva A., Kolokolov D., Stepanov A., Bagryanskaya E. EPR of "breathing" materials with nitroxides. EUROMAR 2013, Hersonissos, Crete, Greece, 30 June – 5 July 2013. P. PS115. (*invited talk*)

Fedin M., Veber S., Drozdyuk I., Maryunina K., Tretyakov E., Matsuoka H., Yamauchi S., Sagdeev R., Ovcharenko V., Bagryanskaya E. EPR of thermo- and photoswitchable copper-nitroxide based molecular magnets. ISMAR 2013, Rio de Janeiro, Brazil, 19-24 May 2013. P. 25 - 26. (*invited talk*)

Fedin M., Bagryanskaya E., Matsuoka H., Yamauchi S., Drozdyuk I., Veber S., Maryunina K., Tretyakov E., Ovcharenko V., Sagdeev R. Light-Induced Spin Dynamics in Copper-Nitroxide Based Molecular Magnets: an EPR study. Asia-Pacific EPR/ESR Symposium 2012, Beijing, China, 11-15 October 2012. (*invited talk*)

Fedin M. V., Veber S.L., Maryunina K.Yu., Ovcharenko V.I., Matsuoka H., Yamauchi S., Bagryanskaya E.G. Nitroxide-copper based photo-switchable molecular magnets studied by EPR. "SPIN 2011", Marseille, France, 26-29 September 2011.

Fedin M. V., Maryunina K.Yu., Sagdeev R.Z., Ovcharenko V.I., Bagryanskaya E.G. EPR study of unusual self-decelerating relaxation of the light-induced spin states in molecular magnets Cu(hfac)<sub>2</sub>LR. The Fifth Japanese-Russian Workshop on Open Shell Compounds and Molecular Spin Devices, November 13-16, 2011, Awaji Island, Japan. (*invited talk*)

- Fedin M. V., Veber S. L., Semenov A. V., Maryunina K. Yu., Ovcharenko V. I., Bagryanskaya E. G.. EPR of thermally and optically switchable exchange clusters in molecular magnets family  $\text{Cu}(\text{hfac})_2\text{L}^{\text{R}}$ . 7th Asia-Pacific EPR/ESR Symposium, Jeju, Korea, 10-14 Oct 2010. (*invited talk*)
- Fedin M., Veber S., Romanenko G., Ovcharenko V., Sagdeev R., Klihm G., Reijerse E., Lubitz W., Bagryanskaya E. Dynamic mixing processes in spin triads of "breathing crystals"  $\text{Cu}(\text{hfac})_2\text{LR}$  : a multifrequency EPR study at 34-244 GHz. 3rd Japanese-Russian Workshop "Open Shell Compounds and Molecular Spin Devices", Awaji, Japan, 16-18 Nov 2009. (*invited talk*)
- Fedin M. Photoinduced spin state switching in "breathing crystals"  $\text{Cu}(\text{hfac})_2\text{LR}$ . Osaka City University symposium on Chemistry and Topology, Osaka, Japan, 19 Nov 2009. (*invited talk*)
- Fedin M., Veber S., Ovcharenko V., Reijerse E., Lubitz W., Bagryanskaya E. Thermal and optical switching of exchange interactions in spin triads of "breathing crystals": an EPR study at 9-244 GHz. 7th European Federation of EPR groups meeting, Antwerp, Belgium, 7-11 Sep 2009.
- Fedin M. V., Veber S. L., Sagdeev R. Z., Ovcharenko V. I., Bagryanskaya E. G. EPR of strongly coupled exchange clusters of copper with nitroxides: new aspects and approaches. I International Conference "Physics and Chemistry techniques for the investigation of nanoobjects in Chemistry, Biology and Medicine", Tuapse, 3-9 October 2007.
- Fedin M., Veber S., Gromov I., Maryunina K., Fokin S., Ovcharenko V., Sagdeev R., Bagryanskaya E. EPR of strongly exchange-coupled spin triads nitroxide-copper(II)-nitroxide: new aspects and approaches. 1st Russian-Japanese Workshop "Open Shell Compounds and Molecular Spin Devices", Novosibirsk, 30 June - 2 July 2007.
- Fedin M., Veber S., Gromov I., Ovcharenko V., Bagryanskaya E. Spin Transitions and Exchange Interactions in Strongly-Coupled Spin Triads as Studied by EPR. Spin Chemistry Meeting 2007, Venice, 18-21 June 2007. (*invited talk*)
- Fedin M.V., Veber S.L., Ovcharenko V.I., Bagryanskaya E.G., Gromov I.A., Schweiger A. EPR of three-spin nitroxide-copper(II)-nitroxide clusters coupled by a strong exchange interaction. 6th European Federation of EPR groups meeting, Madrid (Spain), 5-8 September. (*invited talk*)
- Fedin M.V., Gromov I.A., Schweiger A. Applications of Multiple-Photon Transitions in Pulse and CW EPR. Sendai-Berlin-Novosibirsk Seminar on Advanced EPR, Novosibirsk, 28-31 August 2006.
- Fedin M.V., Veber S.L., Gromov I.A., Schweiger A., Ovcharenko V.I., Bagryanskaya E.G. EPR study of strongly-coupled copper-nitroxide clusters. 5th Asia-Pacific EPR/ESR Symposium, Novosibirsk, 24-27 August 2006.
- Fedin, M., Kalin, M., Gromov, I. and Schweiger, A. 5th meeting of the European Federation of EPR groups, September 7-11, 2003, Lisbon, Portugal.