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RESEARCH INTERESTS:

My work as a material scientist with background in inorganic chemistry focused on creating new functional materials and investigating their properties, using a broad range of synthetical and analytical techniques at extreme conditions.

PROFESSIONAL EXPERIENCE:

Assistant Professor, Chemistry and Biochemistry Department, Florida International University, Miami, FL 2021 - present
High pressure chemistry of borides and nitrides of the Rare-Earth elements

Postdoctoral fellow, Physics Department, Harvard University, Cambridge, MA 2020 - 2021
Faculty Advisor: Isaac F. Silvera, Thomas Dudley Cabot Professor of the Natural Sciences
Optical properties of solid metallic hydrogen at ultra-low temperature and ultra-high pressure

Postdoctoral researcher, Earth and Planets Laboratory (former Geophysical Laboratory), Carnegie Science, Washington, DC 2018 – 2020
Faculty Advisor: Alexander F. Goncharov, Staff Scientist
Thermal conductivity of Earth minerals and other materials at high pressures and high temperatures

Postdoctoral researcher, LSPM-CNRS, Institut Galilée, Université Paris Nord 2017 – 2018
Faculty Advisor: Andreas Zerr
Synthesis and structure analysis of silicon, germanium and tin nitrides and their solid solutions with spinel structure at various high-pressure and high-temperature conditions at multi-anvil apparatus (MAA)

EDUCATION:

Ph.D. in Materials Science, Laboratory of Crystallography, Physics Department, University of Bayreuth, Germany. 2017
Supervisor: Prof. Dr. Natalia Dubrovinskaia
Project topic: High pressure synthesis and investigations of properties of boron allotropes and boron carbide

Diploma in Science, Inorganic Chemistry Division, Chemistry Department, Lomonosov Moscow State University, Moscow, Russian Federation. 2014
Supervisor: Dr. A.E. Baranchikov
Diploma topic: Spherical particles of yttrium hydroxycarbonates and yttrium oxide doped with rare earth elements (Gd, Eu).

PUBLICATIONS:

- 15) X. Zhang, M. Bykov, E. Bykova, **I. Chuvashova**, D. Butenko, V. Prakapenka, D. Smith, Y. Wang, J. Lv, A. F. Goncharov // Stability of peroxide group in BaO₂ under high pressure // *Physical Review B*, 2021, 103, 094104. doi: 10.1103/PhysRevB.103.094104
- 14) W.-P. Hsieh, A.F. Goncharov, **I. Chuvashova**, S. Labrosse, N. Holtgrewe, S. S. Lobanov, F. Deschamps, J.-F. Lin. Silicon lowers the thermal conductivity of Earth's core // *Nature Communications* 11, Article number: 3332 (2020), doi: 10.1038/s41467-020-17106-7.
- 13) S. V. Ovsyannikov, M. Bykov, S. A. Medvedev, P. G. Naumov, A. Jesche, A. A. Tsirlin, E. Bykova, **I. Chuvashova**, A. E. Karkin, V. Dyadkin, D. Chernyshov, L. S. Dubrovinsky. A Room-Temperature Verwey-Type Transition in Iron Oxide, Fe₅O₆ // *Angew. Chem. Int. Ed.* 59, 1 – 6 (Very Important Paper) (2020) doi: 10.1002/anie.201914988.
- 12) A. F. Goncharov, **I. Chuvashova**, Ch. Ji, H-K. Mao. Intermolecular coupling and fluxional behavior of hydrogen in phase IV// *PNAS* 116 (51) 25512-25515 (2019), doi: 10.1073/pnas.1916385116
- 11) S. Ovsyannikov, M. Bykov, E. Bykova, K. Glazyrin, R. Manna, A. Tsirlin, V. Cerantola, I. Kuppenko, A. Kurnosov, I. Kantor, A. Pakhomova, **I. Chuvashova**, A. Chumakov, R. Rüffer, C. McCammon, L. Dubrovinsky. Pressure tuning of charge ordering in iron oxide, Fe₄O₅ // *Nature Communications* vol. 9, Art. No. 4142 (2018); doi: 10.1038/s41467-018-06457-x.
- 10) M. Bykov, E. Bykova, G. Aprilis, K. Glazyrin, E. Koemets, **I. Chuvashova**, M. Mezouar, V. Prakapenka, H.-P. Liermann, F. Tasnádi, A. V. Ponomareva, I. A. Abrikosov, N. Dubrovinskaia, L. Dubrovinsky. Fe-N system at extreme conditions reveals a compound featuring polymeric nitrogen chains // *Nature Communications* 9, Article number: 2756 (2018); doi: 10.1038/s41467-018-05143-2
- 9) M. Bykov, E. Bykova, G. Aprilis, K. Glazyrin, E. Koemets, **I. Chuvashova**, M. Mezouar, H.-P. Liermann, N. Dubrovinskaia, L. Dubrovinsky. Novel nitrogen-rich iron nitrides synthesized at high-pressure high-temperature conditions // *Acta Cryst.* (2017). A73, C1104 <https://journals.iucr.org/a/issues/2017/a2/00/a56200/a56200.pdf>
- 8) **I. Chuvashova**, B. Gasharova, Y-L. Mathis, L. Dubrovinsky, N. Dubrovinskaia. Structural stability of boron carbide under pressure proven by spectroscopic studies up to 73 GPa // *Z. Anorg. Allg. Chem.*, 643, 1357-1363, (2017) , doi:10.1002/zaac.201700243
- 7) **I. Chuvashova**, E. Bykova, M. Bykov, V. Svitlyk, L. Dubrovinsky, N. Dubrovinskaia. Structural stability and mechanism of compression of stoichiometric B₁₃C₂ up to 68 GPa // *Scientific Reports* 7: 8969 (2017). doi:10.1038/s41598-017-09012-8.
- 6) **I. Chuvashova**, E. Bykova, M. Bykov, V. Prakapenka, K. Glazyrin, M. Mezouar, L. Dubrovinsky, N. Dubrovinskaia. First non-icosahedral boron allotrope synthesized at high pressure and high temperature // *Physical Review B* V.95, Iss. 18, 180102(R) (2017). doi: 10.1103/PhysRevB.95.180102
- 5) **I. Chuvashova**, E. Bykova, M. Bykov, V. Svitlyk, B. Gasharova, Y-L. Mathis, R. Caracas, L. Dubrovinsky, N. Dubrovinskaia. High-pressure behavior of α -boron studied on single crystals by X-ray diffraction, Raman and IR spectroscopy // *Journal of Solid State Chemistry* V.245, P.50-60 (2017). doi: 10.1016/j.jssc.2016.10.002
- 4) N. Dubrovinskaia, L. Dubrovinsky, N. Solopova, A. Abakumov, S. Turner, M. Hanfland, E. Bykova, M. Bykov, C. Prescher, V. Prakapenka, S. Petitgirard, **I. Chuvashova**, B. Gasharova, Y-L. Mathis, P. Ershov, I. Snigireva, A. Snigirev. Terapascal Static Pressure Generation with Ultrahigh Yield Strength Nanodiamond // *Science Advances* V.2, No 7, e1600341 (2016). doi: 10.1126/sciadv.1600341

- 3) **I. Chuvashova**, A.S. Vanetsev, O.M. Gaitko, G.P. Kopitsa, V.M. Garamus, Y.V. Orlovskii, Yu.D. Tretyakov. Effect of synthesis conditions on the micro- and mesostructure of monodisperse $Y(OH)CO_3$ powders // *Doklady Chemistry*. V. 446, Part 2, P. 207–211 (2012). doi: 10.1134/S0012500812100011
- 2) A.S. Vanetsev, O.M. Gaitko, **I. Chuvashova**, M.N. Sokolov, Yu.D. Tretyakov. Microwave-hydrothermal synthesis of nanodisperse $YV_{1-x}P_xO_4:Eu$ powders. // *Doklady Chemistry*. V. 441, Part 1, P. 325–329 (2011). doi: 10.1134/S0012500811110097
- 1) A.S. Vanetsev, E.A. Karpukhina, **I. Chuvashova**, O.M. Gaitko, A.E. Barantchikov, Y.V. Orlovskii, V.V. Osiko, Yu.D. Tretyakov. Microwave synthesis of monodisperse luminescent $Y_{2-x}Eu_xO_3$ powders with spherical particles of predetermined size // *Doklady Chemistry*. 2010. V. 435. Part 1. P. 289-293 (2010). doi: 10.1134/S0012500810110054

PAPERS IN PROGRESS:

- A. Zerr, **I. Chuvashova**, H. Hu, N. Guignot, H. Vach, G. Peslherbe. Evidence about the hardness of hypothetical dense polymorphs of C_3N_4 relative to diamond // *submitted to PRL*
- I. Chuvashova**, A. F. Goncharov. Novel approach to direct measurements of thermal conductivity of materials at high pressures and high temperatures // *in writing*
- I. Chuvashova**, Z. Geballe, S. Lobanov, L. Schifferle, A. F. Goncharov. Thermal conductivity of ferropericlase at extreme conditions // *in writing*

FUNDED RESEARCH:

OPTEC company personal grant to support young scientists for the project “Synthesis and morphology study of monodisperse particles of $Y_{2-x}Gd_xO_3$ solid solutions” **2013**

PROFESSIONAL MEMBERSHIPS:

- ACS member
- MRS member
- AGU member