

## Curriculum Vitae

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| <b>Personal details</b>                          | Karel Knížek, RNDr. Dr.  |
|  | Email: <a href="mailto:knizek@fzu.cz">knizek@fzu.cz</a>  |
| <b>Work experience</b>                           | 1991 - 1994: University of Chemical Technology, Prague.<br>1995 – 2023: Researcher in Department of Magnetism and Superconductors, Institute of Physics of the Czech Academy of Sciences, Prague   |
| <b>Recent research activities</b>                | Anomalous Nernst effect and spin Seebeck effect in magnetically ordered conductive phases with various morphology. Research of thermoelectric chalcogenides, preparation of novel systems with rare-earths, interpretation and prediction of thermoelectric properties by electronic structure calculation. Research of magnetic and transport properties of nano-granuled perovskites and ferrites. Controlling software for apparatuses for transport properties measurement and for thermoelectric devices testing. |
| <b>Obtained grants</b>                           | Magnetism and thermomagnetic phenomena of iron nitrides (2022-2025, Czech Science Foundation - International Lead Agency)  |
|  | Transition metal doped Bi <sub>2</sub> O <sub>2</sub> Se layered semiconductors: correlation of transport, magnetic and thermoelectric properties (2022-2024, Czech Science Foundation)  |
|  | Spin Seebeck effect in core-shell magnetic nanocomposites (2019-2022, Czech Science Foundation)  |
|  | Electric transport and magnetism in novel layered cobaltates with rare-earths (2013-2015, Czech Science Foundation)  |
|  | Magnetic polarons in cobaltites (2009-2011, Czech Science Foundation)  |
|  | Preparation, characterization and understanding of magnetoelectric transition metal oxides (2008-2009, MEYS)   |
|  | Electronic structure and local spin states in doped cobaltites (2006-2008, Czech Science Foundation)   |
|  | Structural and physical properties relations of high temperature superconductors with a focus on mercury cuprates (1999-2001, Czech Science Foundation)  |
| <b>Teaching and supervision</b>                  | Lectures on the topic "Crystallochemistry" for master's degree at Institute of Chemical Technology, Faculty of Chemical Technology, Prague.  |
|  | Lectures on the topic "Chemical Aspects of Solids" for master's degree at Czech Technical University, Faculty of Nuclear Sciences and Physical Engineering, Prague.  |
|  | Master degree: supervisor, defended 1  |
|  | PhD degree: co-supervisor, defended 2  |
| <b>Prizes and awards</b>                         | 2003: Otto Wichterle Award for young scientists  |
| <b>Professional collaborations with industry</b> | Škoda auto a.s., Mladá Boleslav, Sobriety s.r.o., Kuřim<br>Collaboration with Škoda auto since 2008, with Sobriety s.r.o since 2012. Topic: Increase the efficiency of the combustion engine via the recuperation of the waste heat of the exhaust gas by means of thermoelectric device.  |
| <b>Foreign collaboration</b>                     | <ul style="list-style-type: none"> <li>– Stockholm University, Arrhenius Laboratory, Sweden – research of Hg-based superconductors.</li> <li>– Laboratoire CRISMAT ENSICAEN, France – research of Hg-based superconductors.</li> <li>– Institut Jean Lamour, Ecole Nationale Supérieures des Mines de Nancy, France – research of thermoelectric materials.</li> </ul>   |

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|  | <ul style="list-style-type: none"> <li>– EMPA, Solid State Chemistry and Analyses, Switzerland – research of thermoelectric materials.</li> <li>– Faculty of Engineering, Iwate University, Morioka, Japan – research of spin transitions in cobaltites.</li> <li>– Osaka University, Toyonaka, Japan – research of multiferroic hexaferrites.</li> <li>– Instituto de Nanociencia de Aragón, Universidad de Zaragoza, Spain – research of spin Seebeck effect.</li> </ul> |
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| <b>Selected publications</b> | <p>H-index: 34, Citations without self citations: 3500 (Web of Science).<br/> Total number of impacted publications: 187.<br/> ORCID: 0000-0002-0725-0331. Research ID: G-5270-2014</p>  |
|                              | <ol style="list-style-type: none"> <li>1. K.-H. Ahn, Z. Jiráček, K. Knížek, P. Levinský, M. Soroka, L. Beneš, J. Zich, J. Navrátil, J. Hejtmánek, Heat capacity and thermal conductivity of <math>\text{CdCr}_2\text{Se}_4</math> ferromagnet: magnetic field dependence, experiment and calculations, <i>J. Phys. Chem. Solids</i> 174, 111139 (2023).</li> <li>2. M. Soroka, M. Pashchenko, J. Prokleška, J. Buršík, K. Knížek, Spin Seebeck effect in W-type and Z-type hexagonal ferrite thin films, <i>J. Appl. Phys.</i> 132, 245101 (2022).</li> <li>3. K. Knížek, M. Soroka, O. Kaman, J. Kuličková, P. Levinský, J. Hejtmánek, Z. Jiráček, Electronic and heat transport phenomena in the nanogranular thiospinel <math>\text{Fe}_3\text{S}_4</math>, <i>Phys. Rev. B</i> 103, 245129 (2021).</li> <li>4. K.-H. Ahn, M. Soroka, P. Levinský, V. Kucek, J. Navrátil, K. Knížek, J. Hejtmánek, Thermal transport in <math>\text{CuCr}_2\text{X}_4</math> (<math>\text{X}=\text{S,Se,Te}</math>), experiment and ab-initio calculation, <i>Phys. Rev. B</i> 104, 085146 (2021).</li> <li>5. K. Knížek, M. Pashchenko, P. Levinský, O. Kaman, J. Houdková, P. Jiříček, J. Hejtmánek, M. Soroka, J. Buršík, Spin Seebeck effect in epsilon-<math>\text{Fe}_2\text{O}_3</math> thin layer with high coercive field, <i>J. Appl. Phys.</i> 124, 213904 (2018).</li> <li>6. K. Knížek, LDA+U calculation of electronic and thermoelectric properties of doped <math>\text{CuCoO}_2</math>, <i>Phys. Rev. B</i> 91, 075125 (2015).</li> <li>7. K. Knížek, J. Hejtmánek, M. Maryško, P. Novák, E. Šantavá, Z. Jiráček, T. Naito, H. Fujishiro, Clarina de la Cruz, Spin-state crossover and low-temperature magnetic state in yttrium-doped <math>\text{Pr}_{0.7}\text{Ca}_{0.3}\text{CoO}_3</math>, <i>Phys. Rev. B</i> 88, 224412 (2013).</li> <li>8. K. Knížek, J. Hejtmánek, M. Maryško, Z. Jiráček, J. Buršík, Stabilization of the high-spin state of <math>\text{Co}^{3+}</math> in <math>\text{LaCo}_{1-x}\text{Rh}_x\text{O}_3</math>, <i>Phys. Rev. B</i> 85, 134401 (2012).</li> <li>9. K. Z. Rushchanskii, S. Kamba, V. Goian, P. Vaněk, M. Savinov, J. Prokleška, D. Nuzhnyy, K. Knížek, F. Laufek, S. Eckel, S. K. Lamoreaux, A. O. Sushkov, M. Ležaić, N. A. Spaldin, A multiferroic material to search for the permanent electric dipole moment of the electron, <i>Nature Mater.</i> 9, 649 (2010).</li> <li>10. K. Knížek, J. Hejtmánek, P. Novák, Z. Jiráček, Charge transfer, valence, and the metal-insulator transition in <math>\text{Pr}_{0.5}\text{Ca}_{0.5}\text{CoO}_3</math>, <i>Phys. Rev. B</i> 81, 155113 (2010).</li> </ol> |