

Mikhail Kislitsyn, Ph.D.
Senior Associate

Professional Profile

Dr. Kislitsyn's areas of expertise include electrochemistry, chemical compatibility, and reactivity, and he has applied this area of expertise to battery and fuel cell projects as well as a variety of polymer projects. Dr. Kislitsyn's electrochemistry expertise has been focused on composite Li^+ - and H^+ - ion conducting material behavior in Li-ion batteries and fuel cells. He has utilized and applied spectroscopy methods (in-situ X-ray diffraction, AC impedance, FTIR, NMR) for phase evolution and characterization, high temperature creep measurements, and degradation mechanisms of the ion conducting materials. While at Exponent, Dr. Kislitsyn has been active in the battery area, performing materials evaluations, cell evaluations, and battery failure analysis.

Dr. Kislitsyn is also active in the areas of coating and polymer failures, particularly with respect to coating and polymer degradation, staining, and chemical compatibility. He has experience assessing and analyzing coating and polymer degradation mechanisms, reaction products, typical antioxidant/coloring materials for polymers, and their effect on staining resistance and color stability. Dr. Kislitsyn has worked with polyurethane, polyethylene, polycarbonate, epoxy- and silicon-based polymer families and composites, and parylene coatings. Specifically, Dr. Kislitsyn has been involved in helping clients choose and test weather- and stain-resistant polymers, coatings and formulations.

Prior to joining Exponent, Dr. Kislitsyn was a Research Assistant in the Solid State Ionics and Electroceramics group at Caltech. He developed diffraction techniques for quantitative crystalline and amorphous phase characterization in composites and coatings. During his graduate program, he synthesized and characterized hybrid organic/inorganic materials, and materials with nano-size coatings for their property enhancement, as well as engineered creep-resistant fuel cell electrolyte material.

Dr. Kislitsyn has been a teaching assistant for various materials science courses including, "Structure and Bonding in Materials," "Application of Diffraction Techniques in Materials," "Fundamentals of the Material Science," and "Engineering of Biomaterials," as well as a laboratory course entitled, "Materials Science Laboratory," which covered different modern mechanical properties testing and characterization techniques.

Academic Credentials and Professional Honors

Ph. D., Materials Science, California Institute of Technology, 2009
M.S., Materials Science, California Institute of Technology, 2005
M.S. Inorganic Chemistry, Russian Academy of Sciences, Russia (*cum laude*), 2003
B.S. Inorganic Chemistry, Russian Academy of Sciences, Russia, 2001

Summer Undergraduate Research Fellowship, Caltech, 2002

Languages

Russian, Native speaker

Publications

Kislitsyn M, Haile SM. Influence of silica nanoparticles on the crystallization behavior of and proton relaxation in cesium hydrogen sulfate. *Chem Mater* 2010; 22(8):2417–2426.

Louie MW, Kislitsyn MN, Bhattacharya K, Haile SM. Phase transformation and hysteresis behavior in $\text{Cs}_{1-x}\text{Rb}_x\text{H}_2\text{PO}_4$. *Solid State Ionics* 2010; 181(3–4) Special Issue:173–179.

Stenina IA, Kislitsyn MN, Ghuravley NA, Yaroslavtsev AB. Phase transitions and ionic mobility in hydrogen zirconium phosphates with the NASICON structure, $\text{H}_{1\pm x}\text{Zr}_{2x}\text{M}_x(\text{PO}_4)_3 \cdot n\text{H}_2\text{O}$, $\text{M} = \text{Nb}, \text{Y}$. *Mater Res Bull* 2008; 43(2):377–383.

Stenina IA, Kislitsyn MN, Pinus IY, Haile SM, Yaroslavtsev AB. Phase transitions and ion conductivity in NASICON-type compounds $\text{Li}_{1\pm x}\text{Zr}_{2-x}\text{M}_x(\text{PO}_4)_3$, $\text{M} = \text{Ta}, \text{Nb}, \text{Y}, \text{Sc}$. In: *Kurnakov Diffusion and Defect Data—Solid State Data A: Defect Diffusion Forum* 2006; 249:255–262.

Stenina IA, Kislitsyn MN, Pinus IY, Arkhangel'skii IV, Zhuravlev NA; Yaroslavtsev AB. Phase transitions and cation mobility in NASICON-type lithium zirconium double phosphates $\text{Li}_{1\pm x}\text{M}_x(\text{PO}_4)_3$ ($\text{M} = \text{Sc}, \text{Y}, \text{In}, \text{Nb}, \text{Ta}$). *Russian J Inorg Chem* 2005; 50(6):985–990.

Stenina IA, Kislitsyn MN, Veresov AG, Kirik SE, Sergeev VG, Lokshin BV, Yaroslavtsev AB. Cationic mobility in composites based on sodium poly(styrenesulfonate) and mesoporous silica. *Russian J Inorg Chem* 2004; 49(12):2089–2094.

Stenina IA, Kislitsyn MN, Pinus IY, Yaroslavtsev AB. Phase transition through intermediate formation? *Mendeleev Comm* 2004; (5):191–193.

Kislitsyn MN, Ketsko VA, Yaroslavtsev AB. Kinetics of solid-phase ion exchange into tin hydrogen phosphate. *Russian J Inorg Chem* 2004; 49(3):367–370.

Kislitsyn MN, Yaroslavtsev AB. Solid state reactions of alkali metal chlorides with acid tantalum phosphate, acid zirconium phosphate and vanadium oxyphosphate. *Solid State Ionics* 2003; (162–163):197–202.

Kislitsyn MN, Gorbunova YG, Ketsko VA, Yaroslavtsev AB. Vanadium oxyphosphate intercalation by alkali-metal ions. *Russian J Inorg Chem* 2003; 48(4):563–567.

Kislitsyn MN, Slagle IR, Knyazev VD. Kinetics of the reaction between methyl radical and acetylene. Proceedings, Combustion Institute 2002; 29(Pt. 1):1237–1245.

Kislitsyn MN, Baranchikov AE, Ivanov VK, Tret'yakov YD, Yaroslavtsev AB. Effect of ultrasonic processing on solid-state H⁺/Cs⁺ ion exchange in acid zirconium and tantalum phosphates. Inorganic Materials (Translation of Neorganicheskie Materialy) 2002; 38(7):714–717.

Tarnopol'skii VA, Ketsko VA, Kislitsyn MN, Kotov VY, Yaroslavtsev AB. Solid-state interaction between tantalum hydrogen phosphate and alkali metal chlorides. Russian J Inorg Chem 2000; 45(10):1625–1630.

Kislitsyn MN, Kotov VY, Yaroslavtsev AB. Ion exchanges H⁺-Li⁺ and H⁺-Na⁺ in titanium hydrogen phosphate. Russian J Inorg Chem 2000; 45(3):376–381.

Ketsko VA, Kislitsyn MN, Kotov VY, Yaroslavtsev AB. Kinetics of the proton-alkali metal cation exchange in zirconium hydrogen phosphate. Russian J Inorg Chem 1999; 44(12):1984–1987.

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Professional Affiliations

American Chemical Society (member)

Electrochemical Society (member)