

Curriculum Vitae  
Alexey Shvarev, Ph.D

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**RESEARCH INTERESTS**

Bioanalytical chemistry, electrochemical and optical ion-selective sensors, biosensors, sensors for anticoagulants.

**CURRENT RESEARCH PROJECTS**

- Photoresponsive Ion-Selective Optical Sensors. Collaborators: J. Westall (Department Of Chemistry, OSU)
- Beyond Sensing under Equilibrium: Photoresponsive Nanoprobes for Rapid Localized Acid-Base Titration (collaborators Oksana Ostroverkhova, David H. McIntyre, Department of Physics, OSU), PhD student Valeriya Bychkova.
- Solid Contact Chronopotentiometric Ion-Selective Sensors. PhD Student: Hasini Pereira.
- Non-Separation Electrochemical Assays for Enzyme Activities Based On Chronopotentiometric Ion-Selective Sensors. M.S. Student: Katherine Fordyce.
- Polyion-Selective Sensors, Sensor for Anticoagulants, Heparin-Selective Ionophores. Collaborators: Rich Carter (Department Of Chemistry, OSU)

**CURRENT FINANCIAL SUPPORT**

- ONAMI, Nanometrology and Nanoelectronics Initiative, "Beyond Sensing under Equilibrium: Photoresponsive Nanoprobes for Rapid Localized Acid-Base Titration" (FY07)  
09/01/2007 – 09/01/2008, \$61,000.
- PNNL subcontract, "Characterization of Binding Characteristics of Ionophore Compounds",  
07/01/2007-02/01/2008, \$10,000.

**PENDING FINANCIAL SUPPORT**

- NIH, "Photoresponsive ion-selective sensors: novel tools for the detection and manipulation of metal ion concentrations", [PA07-276] - METALS IN MEDICINE (R01). 01/01/2008 – 01/01/2012, \$1,004,632
- NIH, "Ion-selective electrochemical sensor for the detection of anticoagulant heparin in whole blood". (R01), resubmission Nov. 2007, 5 years, \$1,247,267.

## EDUCATION

- 2002 -2005 Postdoctoral Fellow, Auburn University (Auburn, AL), 2002  
Advisor: Prof. Eric Bakker
- 1995-2000 Ph.D., Department of Physical Chemistry, St.Petersburg State University  
(St.Petersburg, Russia).  
Dissertation thesis: "New sensor abilities of ion-selective electrodes with  
polymeric membranes"  
Advisor: Prof. K.N. Mikhelson
- 1990-1995 B.S., Chemistry Department, St.Petersburg State University  
(St.Petersburg, Russia), 1995.  
Advisor: Prof. K.N. Mikhelson

## PROFESSIONAL APPOINTMENTS

- 2007 Summer Visiting Professor at Peter C. Rock Thermochemistry Facility at UC Davis
- 2005-present Assistant Professor, Department of Chemistry, Oregon State University**
- 2002-2005 Postdoctoral fellow, Department of Chemistry and Biochemistry,  
Auburn University (Auburn, AL),
- 1999-2002 Research chemist, AQUAPHOR Corp. (Russia, St.Petersburg, division of  
Electrophor Inc., Dobbs Ferry, NY),
- 1995-2000 Graduate student, graduate research assistant, Department of Chemistry,  
St.Petersburg State University (St.Petersburg, Russia).
- 1993-1995 Undergraduate student, research assistant, research, Department of Chemistry,  
St.Petersburg State University (St.Petersburg, Russia)

## TEACHING SUMMARY

Teaching undergraduate/graduate level course in Analytical Chemistry

- CH421/521 Analytical Chemistry
- CH324 Quantitative Analysis

Teaching graduate level Chemistry courses

- CH660 Spectrochemical Analysis
- CH 696 Microcomputer Interfacing

## PROFESSIONAL AFFILIATIONS

**2007** American Chemical Society, Chair-Elect, Oregon Section.

## **PUBLICATIONS:**

### **Invited book chapter**

Bakker E., Shvarev A., Makarychev-Mikhailov S., New Trends in Ion-Selective Electrodes Chemical Sensors, in Biosensors and Their Biomedical Applications, Elsevier, *in press*, Oct. 2007

### **Serial refereed journal articles**

#### **Publications at OSU:**

##### **2007**

1. Perera H., Shvarev A. Unbiased Selectivity Coefficients Obtained for the Pulsed Chronopotentiometric Polymeric Membrane Ion Sensors, *submitted to Journal of the American Chemical Society*.
2. Fordyce K., Shvarev A., Monitoring Peptidase Activities Via Solid-Contact Pulsed Galvanostatic Polyion Sensors, *submitted to Analytical Chemistry, accepted with minor revision*
3. Perera H., Fordyce K.M., Shvarev A. Pulsed Galvanostatic Control of Solid-State Polymeric Ion-Selective Electrodes, *Anal. Chem.* 2007, 79(12), 4564-4573.

##### **2006**

4. Shvarev, A., Photoresponsive Ion-Selective Optical Sensor, *J. Am. Chem. Soc.* 2006, 128, 7138-7139.

#### **Other publications**

##### **2007**

1. Xu Y., Xu C., Shvarev A., Becker T., De Marco R., Bakker E. Kinetic Modulation of Pulsed Chronopotentiometric Polymeric Membrane Ion Sensors by Polyelectrolyte Multilayers, *Anal. Chem.* **2007**, 79(18), 7154-7160.
2. Gemene K.L, Shvarev A., Bakker E., Selectivity Enhancement of Anion-Responsive Electrodes by Pulsed Chronopotentiometry, *An. Chim. Acta* **2007**, 583, 190-196.

##### **2006**

3. Bhakthavatsalam V., Shvarev A., Bakker E., Selective Coulometric Release of Ions from Ion Selective Polymeric Membranes for Calibration-Free Titrations, *Analyst* **2006**, 131, 895-900.
4. Makarychev-Mikhailov S., Shvarev A., Bakker E., Pulstrodes: Calcium Pulstrodes for Highly Sensitive Measurements in the Physiological Concentration Range, *Anal. Chem.* **2006**, 78(8), 2744-2751.

##### **2001-2005**

5. Shvarev A., Bakker E., Reversible Electrochemical Sensor for the Polyion Protamine in Whole Blood, *Anal.Chem.* **2005**, 77, 5221-5228.
6. Xu Y., De Marco R., Shvarev A., Bakker E. Reversible electrochemical monitoring of surface confined reactions at liquid-liquid interfaces by modulation of ion transfer fluxes, *Chemical Communications* **2005**, 24, 3074-3076.

7. Makarychev-Mikhailov S., Shvarev A., Bakker E., Pulstrodes: Triple-Pulse Galvanostatic Control of Ion-Selective Membranes, *J. Am. Chem. Soc.* **2004**, 126, 10548-10549.
8. Shvarev A., Bakker E., Distinguishing free and total calcium with a single pulsed galvanostatic ion-selective electrode, *Talanta* **2004**, 63, 195-200.
9. Shvarev A., Bakker E., Reversible Electrochemical Detection of Nonelectroactive Polyions, *J. of Am. Chem. Soc.* **2003**, 125, 11192-11193.
10. Shvarev A., Bakker E., Pulsed Galvanostatic Control of Ionophore-Based Polymeric Ion Sensors, *Anal. Chem.* **2003**, 75, 4541-4550.
11. Shvarev A.E., Rantsan D.A., Mikhelson K.N, Potassium selective conductometric sensor, *Sensors and Actuators B*, **2001**, 76, 500-505.

### Patents

1. Reversible electrochemical sensors for polyions, Shvarev A., Bakker E., US&PCT N11/494,885.
2. Shvarev A.E., Pimenov A.V., Mitilineos A.G., Shmidt J.L., The composite regenerable activated carbon (CRAC) and its regeneration method, US N6.391.185, **2002**.
3. Shvarev A.E., Pimenov A.V., Mitilineos A.G., Shmidt J., The regenerable device for purification of liquid media, RU N2182033, **2002**.
4. Shvarev A.E., Pimenov A.V., Mitilineos A.G., Shmidt J., The composite regenerable activated carbon and method for its regeneration, RU N2171139, **2001**.

### PRESENTATIONS:

#### Invited presentations

1. Ostroverkhova O., David H. McIntyre, D.H., Shvarev A., Beyond Sensing under Equilibrium: Photoresponsive Nanoprobes for Rapid Localized Acid-Base Titration PITTCON, New Orleans, LA, March, **2008**.
2. Westall J., Shvarev A., Experimental and Theoretical Investigation of the Response Mechanism of Light-Controlled Ion-Selective Optical Sensors (invited presentation), PITTCON, Chicago, IL, February 25-March 2, **2007**.

#### Other presentations

1. Blakemore, Paul R.; Milicevic, Selena D.; Perera, Hasini; Shvarev, Alexey; Zakharov, Lev N. Lone-pair/lone-pair proximity effects in a series of cyclic diethers derived from 7,7'-dihydroxy-8,8'-biquinolyl. Abstracts of Papers, 234th ACS National Meeting, Boston, MA, United States, August 19-23, **2007**.

2. Shvarev A., Light-Controlled Ion-Selective Optical Sensors, PITTCON, Orlando, FL, March 12-17, **2006**.
3. Direct Detection of Heparin in Whole Blood with Reversible Electrochemical Sensors, PITTCON, Orlando, FL, February 27 -March 4, **2005**.
4. Shvarev A., Bakker E., Reversible electrochemical detection of polyions, PITTCON, Chicago, IL, March 7-12, **2004**.
5. Bakker, E., Shvarev, A., Makarychev-Mikhailov, S., Xu, Y., Instrumental Control of Potentiometric Sensors. Abstracts, 56th Southeast Regional Meeting of the American Chemical Society, NC, November 10-13, **2004**.
6. Radu A., Shvarev A., Bakker E., Coupling Stripping Analysis to Ultrasensitive Potentiometric Detection, PITTCON, Chicago, **2004**
7. Shvarev A., Bakker E., Galvanostatic control of ion selective membranes, PITTCON, Orlando, FL, March 9-14, **2003**.
8. Shvarev A.E., Shkapov D.A, Mikhelson K.N., Potassium selective conductometric sensor, Abstracts of Sensor 2000 (Sensors and MST), St.Petersburg, Russia, **2000**, 33.
9. Shvarev A.E., Shkapov D.A. and Mikhelson K.N., Potassium selective conductometric sensor, Abstracts of 8-th International Meeting on Chemical Sensors, Basel, Switzerland, **2000**, 216.
10. Shvarev A.E., Lutov V.M, Mikhelson K.N., Thin nitrate-selective sensor with supported PVC membrane: selectivity and interfacial kinetics, Proceeding Eurosensors X, Leuven, Belgium, **1996**, 2, 697-700.