

Nenad M. Markovic
Materials Science Division
Argonne National Laboratory
9700 S Cass Avenue, IL-60559
nmarkovic@anl.gov;
Telephone: 630-252-5181



EDUCATION:

Ph.D., Chemistry (Energy Conversion), University of Belgrade, Belgrade, Yugoslavia (05/1984).

M.S., Chemistry (Energy Conversion), University of Belgrade, Belgrade, Yugoslavia (03/1982).

B.S., Faculty of Technology and Metallurgy, Univ. of Belgrade, Belgrade, Yugoslavia (03/1977).

PROFESSIONAL EXPERIENCE:

2014-present: Chief Scientist at Joint Center for Energy Storage Research, Argonne National Laboratory, Argonne, IL, USA.

2012-present: Argonne Distinguished Fellow and Group Leader, Argonne National Laboratory, Argonne, IL, USA.

2012-2014: Deputy Director (Research) at Joint Center for Energy Storage Research, Argonne National Laboratory, Argonne, IL, USA.

2005-2012: Senior Scientist and Group Leader-Energy Conversion and Storage, Argonne National Laboratory, Material Sciences Division, Argonne, IL, USA.

1991 - 2005: Staff Scientist, Lawrence Berkeley National Laboratory, Materials Sciences Division, Berkeley, CA 94720, USA.

1986 - 1991: Group Leader, Institute of Electrochemistry, University of Belgrade, Belgrade, Yugoslavia.

1984 - 1986: Postdoctoral Fellow with Professor Ernest Yeager, Department of Chemistry, Case Western Reserve University, Cleveland, OH 44106, USA

1978 - 1984: Research Associate, University of Belgrade, Belgrade, Yugoslavia.

RESEARCH INTEREST

- Directing electrochemical interfaces at atomic and molecular levels
- Exploring fundamental descriptors for controlling energy/environment cycles based on water, carbon and nitrogen chemistries
- Development of electrode materials with tailored properties
- Synthesis, characterization and utilization of real-world catalysts
- Bridging the gap between aqueous and organic based environments
- Technology developments

PROGRAMS DEVELOPED

- Surface science approach in electrochemistry
- Energy conversion systems - Fuel Cells
- Fuel production – Electrolyzers
- Energy Storage – Batteries

PROJECTS MANAGED

- DOE/BES program for understanding energy transfer at electrochemical interfaces (1.2 M/year)
- DOE/BES program for exploring beyond Li-ion chemistries in organic environments (950 K/year)
- DOE/EERE program for developing new generation of catalyst materials for the ORR in fuel cells (1.2 M/year)
- DOE/EERE program for testing stability of fuel cells cathode materials (100 K/year)
- BMW program for understanding the SEI layer formation in Li-ion batteries (450 K/year)
- EERE/DOE program for developing Li-ion solid-solid batteries (500K/year)
- EERE/DOE program for developing Li- metal protective coatings (200K/year)
- In the past, General Motors, Honda Japan, Nissan Japan , 3M company, Toyota Research Center, Japan , and Toyota America

HONORS AND AWARDS

- 2016 Recipient of Wilhelm-Manchot-Forschungs award; Technical University of Munich, Germany.
- 2016 Guest Editor - Special Issue of Nano Energy

2013	Recipient of the Faraday Medal Award, Electrochemical Royal Society
2012	Distinguished Performance Award by UChicago Argonne LLC in 2012
2011	U.S. Department of Energy R&D Award—Hydrogen and Fuel Cells Program; in recognition of outstanding achievement in reducing platinum group metal content for PEMFC
2011	Fellow of the International Society of Electrochemistry
2005	Lawrence Berkeley National Laboratory Research Award for Developing Nanosegregated Catalysts

REFEREED PUBLICATIONS: (over 260 publications cited over 38,500 times; h-index = 93; source Google Scholar)

Selection of Recent Publications (Since 2007)

- V. Stamenkovic, D. Strmcnik, P. Lopes and **N.M. Markovic**, “Energy and fuels from electrochemical interfaces” *Nature Materials*, 5 (2017)57-69
- J. S. Jirkovsky, C. D. Malliakas, P. P. Lopes, Nemanja Danilovic, S. S. Kota, K-Chul Chang, B. Genorio, D. Strmcnik, V. R. Stamenkovic, M. G. Kanatzidis, **N. M. Markovic**; “Design of Active and Stable Co-Mo-S_x Chalcogels as pH-universal Catalyst for the Hydrogen Evolution Reaction”; *Nature Materials DOI:10.1038/NMAT4481*.
- C. Chen, Y. Kang, Z. Huo, Z. Zhu, W. Huang, H. Xin, J. Snyder, D. Li, J. Herron, M. Mavrikakis, M. Chi, K. More, Y. Li, **N.M. Markovic**, G. Somorjai, P. Yang, and V. R. Stamenkovic, Highly Crystalline Multimetallic Nanoframes with Three-dimensional Electrocatalytic Surfaces”; *Science*, **343** (2014)1339-1343.
- S. Chang, N. Danilovic, K. Chang, R. Subbaraman, A. Paulikas, D. Fong, M. Highland, P. Baldo, V. Stamenkovic, Freeland, J. Eastman, **N. M. Markovic**; “Functional Links between Stability and Reactivity of Strontium Ruthinate Single Crystals during Oxygen Evolution”; *Nature Communication*, **5** (2014) 1-9.
- D. van der Vliet, C. Wang, D. Tripkovic, D. Strmcnik, X.F. Zhang, M.K. Debe. R.T. Atanasoski, **N.M. Markovic**, V.R. Stamenkovic; “Messtructured Thin Films as Electrocatalysts with Tunable Composition and Surface Morphology”; *Nature Materials*, **11** (2012) 550-557.
- **N. M. Markovic**; “Interfacing Electrochemistry”; *Nature Materials*; **12** (2013) 101-102.
- D. Strmcnik, M. Uchimura, C. Wang, R. Subbaraman, N. Danilovic, D. van der Vliet, A. P. Paulikas, V. R. Stamenkovic, and **N. M. Markovic**; “Improving the Hydrogen Oxidation Reaction Rate by Promotion of Hydroxyl Adsorption”; *Nature Chemistry*, **5** (2013) 300-306.
- R. Subbaraman, D. Tripkovic, K-C Chang, D. Strmcnik, A. P. Paulikas, H. P. Hurinsit, M. Chan, J. Greeley, V. Stamenkovic, **N. M. Markovic**; “Trends in Activity for the Water Electrolyzer Reactions on 3d-M(Ni,Co,Fe,Mn)-Hydr(oxy)oxide Catalysts”; *Nature Materials*, **11** (2012) 550-557.
- R. Subbaraman, D. Tripkovic, D. Strmcnik, K-C Chang, M. Uchimura, A. P. Paulikas, V. Stamenkovic, **N. M. Markovic**; “Enhancing Hydrogen Evolution Activity in Water Splitting by Tailoring L⁺-Ni(OH)₂-Pt Interfaces”; *Science*, **334** (2011) 1256-1260.
- B. Genorio, D. Strmcnik, R. Subbaraman, D. Tripkovic, G. Karapetrov, V. R. Stamenkovic, S. Pejovnik, **N. M. Markovic**; “Selective Catalysts for the Hydrogen Oxidation and Oxygen Reduction Reactions by Patterning of Platinum with Calix[4]arene Molecules”; *Nature Materials*, **9** (2010) 998–1003.
- D. Strmcnik, M. Escudero, K. Kodama, V.R. Stamenkovic, A. Cuesta, **N.M. Markovic**, “Enhanced Electrocatalysis of the Oxygen Reduction Reaction Based on Patterning of Platinum Surfaces with Cyanide”; *Nature Chemistry*, **2** (2010) 880-885.
- D. Strmcnik, K. Kodama, D. van der Vliet, J. Greeley, V. Stamenkovic, **N. M. Markovic**; “The Role of Noncovalent Interactions in Electrocatalytic Fuel Cell Reactions on Platinum”; *Nature Chemistry*, **1** (2009) 466-472.
- H. Gasteiger and **N.M. Markovic**; “Just a Dream-or Future Reality”; *Science*, **324** (2009) 48-49.

- V. Stamenkovic, B.S. Mun, M. Arenz, K.J.J. Mayrhofer, C. Lucas, G. Wang, P.N. Ross, **N.M. Markovic**; "Trends in Electrocatalysis on Extended and Nanoscale Pt bimetallic Alloy Surfaces"; *Nature Materials*, **6** (2007) 241-247.
- V. Stamenkovic, B. Fowler, B.S. Mun, G. Wang, P.N. Ross, C. Lucas, and **N. M. Markovic**; "Improved Oxygen Reduction Activity on Pt₃Ni(111) via Increased Surface Site Availability"; *Science*, **315** (2007) 493-497.