

Nancy N. Kariuki

Argonne National Laboratory
9700 South Cass Avenue, Bldg. 205
Argonne, Illinois 60439
Phone: 630/252-4733
Fax: 630/252-4176
e-mail: kariuki@anl.gov

Professional Experience

July 2007-Present: Assistant Chemist, Argonne National Laboratory, Chemical Engineering Division

- Hydrogen and Fuel Cell Materials Research. Developing colloidal synthetic methods for preparing nanocatalyst materials. Electrochemical characterization of catalyst materials

October 2005-June 2007: Postdoctoral Appointee, Argonne National Laboratory, Chemical Engineering Division

- Hydrogen and Fuel Cell Materials Research. Developing colloidal synthetic methods for preparing nanocatalyst materials. Electrochemical characterization of catalyst materials

2001-2005: Graduate Research Assistant, Department of Chemistry, State University of New York at Binghamton

- Developed nanocatalysts for fuel cell catalysis
- Developed new routes for nanoparticle assembly
- Gained fundamental understanding and operation of a broad range of materials characterization techniques and instrumentations
- Studied nanostructured materials for electroanalytical applications

1998-2000: Research fellow, Tsinghua University, Beijing, China

- Designed optimized extraction and analysis of Chinese herbal medicine

1993-1995: MS Graduate Research, Pyrethrum Board of Kenya

- Investigated quality inconsistencies in natural pyrethrum insecticide

Research Interests

- Nanotechnology: nanomaterial synthesis and characterization, nanostructured assembly
- Fuel Cell Technology: catalyst synthesis, electrode preparation
- Energy: alternative sources, conversion, storage
- Electrochemistry: fuel cell characterization, nanoelectrodes, chemical/biological detection
- Surface Science: microscopies and spectroscopies

Education

- Ph.D., Chemistry, State University of New York at Binghamton, 2006
- M.S., Chemistry, Egerton University (Kenya), 1995
- B.S., Chemistry Honors, Egerton University (Kenya), 1990

Awards

- 2005 Materials Chemistry Excellence in Research Fellowship (SUNY-Binghamton)
- 1996 Chinese Government Scholarship (for advanced studies in China)

Professional Society Memberships

- American Chemical Society
- Material Research Society
- Electrochemical Society

Selected Publications

- "Array of Molecularly-Mediated Thin Film Assemblies of Nanoparticles: Correlation of Vapor Sensing with Interparticle Spatial Properties", L. Wang, X. Shi, N. N. Kariuki, M. Schadt, G. R. Wang, Q. Rendeng, J. Choi, J. Luo, S. Lu, C. J. Zhong, *J. Am. Chem. Soc.*, 129, 2161-2170 (2007).
- "Assembly of Bimetallic Gold-Silver Nanoparticles via Selective Interparticle Linkages of Dicarboxylates at Silver Sites" N. N. Kariuki; J. Luo; A. Hassan; M. H. Engelhard; Y. Lin ; C. Wang; C. J. Zhong, *Chem. Mater* 18, 123 (2006).
- "Sensing arrays constructed from nanoparticle thin films and interdigitated microelectrodes" Wang, L. Y.; Kariuki, N. N.; Schadt, M.; Mott, D.; Luo, J.; Zhong, C. J.; Shi, X. J.; Zhang, C.; Hao, W. B.; Lu, S.; Kim, N.; Wang, J. Q. *Sensors*, 6, 667 (2006).
- "Adsorption of Cyanine Dyes on Gold Nanoparticles and Formation of J-Aggregates in the Nanoparticle Assembly", I. S. Lim; F. Goroleski; D. Mott; N. Kariuki; W. Ip; J. Luo; C. J. Zhong, *J. Phys. Chem., B*, 110, 6673, (2006).
- "Ternary Alloy Nanoparticles with Controllable Sizes and Composition and Electrocatalytic Activity", J. Luo; L. Wang; D. Mott; P. Njoki; N. Kariuki; C. J. Zhong; T. He *J. Mater. Chem.* 16, 1665 (2006).
- "Preparation and Characterization of Carbon-supported Pt/Fe Electrocatalysts", J. Luo; N. Kariuki; L. Han; L. Wang; C. J. Zhong, T. He; *Electrochim. Acta*, 51, 4821 (2006).
- "A Multi-Module Artificial Neural Network Approach to Pattern Recognition with Optimized Nanostructured Sensor Array", X. Shi; L. Wang; N. Kariuki; J. Luo; C. J. Zhong; S. Lu, *Sensors & Actuators, B-Chemical* 117, 65 (2006).
- "Phase Properties of Carbon-Supported Gold-Platinum Nanoparticles with Different Bimetallic Compositions" Luo, J.; Maye, M. M.; Petkov, V.; Kariuki, N. N.; Wang, L. Y.; Njoki, P.; Mott, D.; Lin, Y.; Zhong, C. J. *Chem. Mater.* 17, 3086 (2005).

- "Electrocatalytic Oxidation of Methanol: Carbon-Supported Gold-Platinum Nanoparticle Catalysts Prepared by Two-Phase Protocol" J. Luo, M. M. Maye, N. N. Kariuki, L. Wang, P. Njoki, L. Han, M. Schadt, Y. Lin, H. R. Naslund, C.J. Zhong, *Catalysis Today* 99, 291 (2005).
- "Electrocatalytic Reduction of Oxygen: Gold and Gold-Platinum Nanoparticle Catalysts Prepared by Two-Phase Protocol" M. M. Maye, N. N. Kariuki, J. Luo, L. Han, P. Njoki, L. Wang, Y. Lin, H. R. Naslund, C.J. Zhong, *Gold Bulletin*, 37, 217 (2004).
- "Composition-Controlled Synthesis of Bimetallic Gold-Silver Nanoparticles " Kariuki, N. N.; Luo, J.; Maye, M. M.; Hassan, A.; Menard, T.; Patterson, M.; Naslund, H. R.; Lin, Y.; Wang, C.; Engelhard, M. H.; Zhong, C. J. *Langmuir* 20, 11240 (2004).
- "Nanoparticle-Structured Ligand Framework as Electrode Interfaces" Kariuki, N. N.; Luo, J.; Han, L.; Maye, M. M.; Moussa, L.; Patterson, M.; Lin, Y. H.; Engelhard, M. H.; Zhong, C. J. *Electroanalysis* 16, 120 (2004).
- "AFM Probing of Thermal Activation of Molecularly Linked Nanoparticle Assembly" Luo, J.; Jones, V. W.; Han, L.; Maye, M. M.; Kariuki, N. N.; Zhong, C. J. *J. Phys. Chem. B.* 108, 9669 (2004).
- "A Direct Route toward Assembly of Nanoparticle-Carbon Nanotube Composite Materials" Han, L.; Wu, W.; Kirk, F. L.; Luo, J.; Maye, M. M.; Kariuki, N. N.; Lin, Y.; Wang, C.; Zhong, C. J. *Langmuir*. 20, 6019 (2004).
- "Spectroscopic Characterizations of Molecularly Linked Gold Nanoparticle Assemblies upon Thermal Treatment" Luo, J.; Maye, M. M.; Han, L.; Kariuki, N. N.; Jones, V. W.; Lin, Y.; Engelhard, M. H.; Zhong, C. J. *Langmuir* 20, 4254 (2004).
- "Synthesis, Processing, Assembly and Activation of Core-Shell Structured Gold Nanoparticle Catalysts" Maye, M. M.; Luo, J.; Han, L.; Kariuki N.; Zhong, C.J. *Gold Bull.* 36, 75 (2003).
- "Novel Interparticle Spatial Properties of Hydrogen-Bonding Mediated Nanoparticle Assembly" Han, L.; Luo, J.; Kariuki, N.; Maye, M. M.; Jones, V. W.; Zhong, C. J. *Chem. Mater.* 15, 29 (2003).
- "Atomic Scale Imaging: A Hands-On Scanning Probe Microscopy Laboratory for Undergraduates" Zhong, C. J.; Han, L.; Maye, M. M.; Luo, J.; Kariuki, N. N.; Jones, W. E. *J. Chem. Edu.* 80, 194 (2003).
- "Size-Controlled Assembly of Gold Nanoparticles Induced by a Tridentate Thioether Ligand" Maye, M. M.; Luo, J.; Lim, H.S.; Han, L.; Kariuki, N. N.; Rabinovich, D.; Liu, T. B.; Zhong, C. J. *J. Am. Chem. Soc.* 125, 9906 (2003).
- "Gold and Alloy Nanoparticles in Solution and Thin Film Assembly: Spectrophotometric Determination of Molar Absorptivity", Maye, M. M.; Han, L.; Kariuki, N. N.; Ly, N. K.; Chan, W. B.; Luo, J.; Jones, V. W.; Zhong, C. J. *Anal. Chim. Acta.* 496, 17 (2003).
- "Thermal Activation of Molecularly-Wired Gold Nanoparticles on a Substrate as Catalyst" Luo, J.; Jones, V. W.; Maye, M. M.; Han, L.; Kariuki, N. N.; Zhong, C. J. *J. Am. Chem. Soc.* 124, 13988 (2002).