

***“Nanostructured Materials for Renewable and Sustainable Energy Technologies”***

*Professor Ryan Richards  
Department of Chemistry,  
Colorado School of Mines  
National Renewable Energy Lab*

***January 24, 2017***

***Colorado School of Mines  
Ben Parker Student Center, Ballroom A***

*Social 5:30 p.m.*

*Dinner 6:00 p.m.*

*Program 7:00 p.m.*

*General \$20.00*

*Students/Retirees \$10.00*

***Reservation Deadline: Monday, January 16, 2017***

*E-mail reservation information to  
[meganrose@mines.edu](mailto:meganrose@mines.edu) or call 303-273-3610*

## ***Abstract***

The preparation of nanoscale materials is one of the most exciting areas of modern science and is at the forefront of the quest for a sustainable future. The field of nanotechnology has generated a great deal of interest primarily because on this size scale numerous new and potentially useful properties have been observed. These size dependent properties include melting point, specific heat, surface reactivities, catalytic, magnetic, and optical properties. In particular, the Richards' group is working on new synthetic methods to control the size, shape and composition of nanoscale materials and applying them in systems integral to alternative energy technologies, pharmaceuticals, biomass upgrading, batteries, petrochemicals and environmental cleanup. Recently, the Richards' research group has developed techniques to produce a number of new nanoscale materials that have demonstrated unique catalytic activities through controlled faceting as well as novel intercalation strategies. Here, an overview of the recent highlights regarding these materials will be presented as well as exciting opportunities for future directions.

## ***Biosketch***

Ryan Richards is a Professor of Chemistry at the Colorado School of Mines and holds a joint appointment at the National Renewable Energy Laboratory both in Golden, Colorado USA. The Richards group has made a broad range of contributions to the field of inorganic nanoscience in the areas of nanoparticle preparations (metal and metal oxides), in situ spectroscopy, porous materials and catalysis. Prof. Richards has published more than 110 papers, 7 patents and has served as editor/co-editor of 3 nanoscience books. The body of work provides fundamental understanding of nanoscale materials but also application in renewable energy technologies including fuel cells, electrochromic windows and biofuel production. He has received numerous awards throughout his career including most recently being selected as a Fellow of the American Chemical Society. Prof. Richards has been elected by his peers into numerous positions including: Co-Chair of 2017 NAM of the North American Catalysis Society (the largest catalysis conference in North America); 2011 ACS Chair of Nanoscience; 2012 Chair Colorado Section of ACS; and ACS Nanoscience Programming Chair 2011-present. Additionally, he has served as organizer for the ACS Green Chemistry and Sustainability Summer School 2008-present. The Richards group has extensive domestic and international collaborations including: National Renewable Energy Laboratory (NREL), Stanford Linear Accelerator Center (SLAC), Brookhaven National Laboratory (BNL), Lawrence Berkeley National Laboratory, University of Queensland (Australia), Boreskov Institute of Catalysis (Russia), and University of Bucharest (Romania). As an example of our collaborative work, our 2014 Nature Communications paper with BNL, SLAC and LBNL has been designated as one of the top ten scientific breakthroughs of 2014 by BNL.



## ***Driving & Parking Instructions***

*Driving directions from I-25: Take I-70 west, exit Highway 58 to Golden. Exit Washington Street and turn left to enter into downtown Golden. Turn right on 13th Street and left on Maple to enter campus.*

*From Denver: Take 6th Avenue and head west into Golden. Turn right on 19th Street. Turn left on Illinois Street to enter campus.*

*From C-470 or I-70: Head east to 6th Avenue. Follow the directions above from 6th Avenue.*

*From Boulder: Take Highway 93 into Golden. Turn left onto 19th Street. Turn left on Illinois Street to enter campus.*

### ***Parking:***

*Parking is on campus. For full details and a map at <http://inside.mines.edu/UserFiles/File/facilities/MinesCampusMap.pdf>, please visit Mines' parking information at <http://inside.mines.edu/Visitor-Parking-Information>.*

**PLEASE NOTE: From 7:00 a.m. to 5:00 p.m. Mines is a pay-to-park campus.**