CERCAS

The Center for Rational Catalyst Synthesis

CeRCaS News Blast 4/9/19

Ring 1: Make your travel plans! Spring CeRCaS Meeting (May 16-17, 2019) in Richmond.

The Spring CeRCaS meeting will be held at the historic Jefferson Hotel in downtown Richmond, VA (101 West Franklin Street, Richmond, VA 23220, phone 804 649-4750 or 888 918-1895). The group rate is $255; mention that you will be attending the "Center for Rational Catalyst Synthesis" meeting in order to join the block. This discount is available until April 29th.

Additional rooms will be available at the Linden Row Inn (100 E. Franklin Street, 800-348-7424).

A full agenda will circulate soon; plan on arriving Wednesday evening, May 15th. (Those able to arrive early on the 15th might enjoy a round of golf with JR and Frank.) The meeting will end with lunch, Friday May 17th.

Ring 2: Project down-selection has begun; our Pre-LIFE assessment is underway.

As we have grown, our yearly meeting format has evolved and our Spring meetings are now devoted to new project selection. CeRCaS faculty have developed thirty-one potential projects (count'em, 31!). Using the Level of Interest and Feedback Evaluation (LIFE) online survey, the directions for which our members have just received, the projects will be down-selected to about 12-15 for presentation at the Spring meeting. Of these, 6 or 7 will be selected for funding. Take a moment in examing the table of potential projects below to stoke your imagination on the advances in our understanding of supported nanoparticle synthesis these proposals represent.

➔ As always, members can access current and past updates at our password-protected site:
www.che.sc.edu/centers/cercas/projects.html

CERCAS RESEARCH THRUSTS

THRUST 1 **Fundamentals of Metal Deposition**	THRUST 2 **Thermodynamics and Kinetics of Solid-Solid Bonding**	THRUST 3 **Precision site synthesis for specific reactions**

PROPOSED PROJECTS

T1: All Proposed Projects *(PDF)*	T2: All Proposed Projects *(PDF)*	T3: All Proposed Projects *(PDF)*
1. Bimetallic catalyst synthesis with clean/less hazardous reducing agents and metal precursors *(Monnier, Diao)*	1. 3D Printed Catalytic Monolith Year 2: Rational investigation into how catalyst synthesis method affects the nanoparticle surface chemistry and activity on 3dP monoliths *(Ferri, Gupton)*	1. Macroscopic monolithic Pd/Graphene catalysts for regioselective electrochemical oxidation of alkenes *(Gupton, Castano, Weidner)*
2. Development of Highly Dispersed Bimetallic Catalysts using the method of Galvanic Displacement *(Diao, Monnier)*	2. Hydrogenation Activity of Pd particles on Carbon Supports *(Chen, Regalbuto)*	2. Computational and experimental analysis of Ag catalysts with GNP or bimetallic materials on direct propylene oxide synthesis *(Gupton, Reber, Monnier)*
3. Synthesis, structure and catalytic studies of silica-graphene composite's-supported catalysts for selective hydrogenation reactions *(Gupton, Regalbuto, Bertino)*	3. Magnetically recoverable, supported bimetallic catalysts having enhanced activity for cross-coupling reactions *(Gupton, Monnier, Diao, Smith)*	3. Metal oxide-zeolite core-shell structures for direct CO2 hydrogenation to olefins *(Sasmaz, Lauterbach)*
4. Tailored catalytic surface growth through a highly controlled kinetic deposition plasma reactor *(Gupton, Castano, Weidner)*	4. The Hydrodynamic Radius and its Effect on Adsorption *(Gupton, Regalbuto, Khanna, Ferri)*	4. Conversion of biogas to alcohols using catalysis and subsequent fermentation *(Sasmaz, Lauterbach)*
5. One-step photochemical laser ablation synthesis of supported palladium nanoparticles *(Tibbetts, Ferri, Gupton, Regalbuto)*	5. Thermodynamic Analysis of SEA Using Metal Adsorption Isotherm Data *(Gupton, Regalbuto)*	5. Ultrasmall Bimetallic Catalysts for Ullmann Coupling Reaction *(El-Kaderi, Gupton, Regalbuto)*
6. The Effect of Nitrogen Doping on Carbon Supported Pt *(Kaderi, Khanna, Regalbuto, Monnier)*	6. In situ XRD to study the effects of temperature and gas phase on the stability of monometallic catalysts and structure/stability of bimetallic catalysts (Year 2) *(Monnier, Carpenter)*	6. Bimetallic Indium-Copper Catalysts for Hydrogenation of Syngas-Derived Dimethyl Oxalate to Ethylene Glycol*(Williams, Gupton, Regalbuto)*
7. A New Class of Bifunctional Catalysts: Isolated Pt Atoms on Carbon Nanodots *(Lauterbach, Regalbuto)*	7. Developing a three-dimensional graphene oxide architecture with ultrasmall Pd particles as catalyst for Suzuki coupling *(Regalbuto, Gupton)*	7. Simple Synthesis of Highly-Active and Stable Pt3Co/Carbon Oxygen Reduction Reaction Catalyst *(El-Kaderi, Regalbuto, Weidner)*
8. Laser-assisted photochemical synthesis of atypical alloyed bimetallic nanoparticles *(Tibbetts, Ferri, Gupton,*	8. Atomic Layer Deposition of Single-Atom Catalysts for Selective Hydrogenation of Alkenes *(El-Kaderi,*	8. Evaluation of Heterogeneous Asymmetric Hyrdogenation

Khanna, Regalbuto)	*El-Shall, Regalbuto)*	Catalysts*(Gupton, Monnier, Carpenter)*
9. Novel approach for continuous synthesis of supported transition metals catalysts through X-ray radiolysis*(Castano, Rojas, Gupton)*		9. Evaluation of Iron-based/Graphene Catalysts for Fischer-Tropsch Synthesis of Zero-Sulfur Transportation Fuels *(El-Shall, Lauterbach)*
10. Flame Synthesis of Metal Oxynitrides *(Sasmaz, Meekins)*		10. Understanding Active Sites in Bimetallic Catalysts for Hydrodeoxygenation *(Chen, Heyden, Monnier)*
11. Precision tuning of supported nanoparticle size *(Regalbuto, Monnier)*		11. Rational Synthesis of Heterogeneous Catalysis for Direct Hydroamination of Olefins *(Gupton, Roper, Khanna)*
12. Scalable Electrochemical Synthesis of Heterogeneous Catalysts with Controlled Faceting *(Mustain, Monnier, Chen, Weidner, Tang, Carpenter)*		

Ring 3: New membership/third CeRCaS site/additional projects.

Our champion at the University of California at Berkeley, Prof. Alex Katz, is working with JR and Frank to bring Berkeley into the center as a third CeRCaS site for Phase 2 of our operation, which will begin in 2020 and last for five years. In the meantime, for the fifth year of Phase 1, the companies Prof. Katz is recruiting will join the center via USC, and support projects at Berkeley as an affiliate site. The new member companies and the projects they will support will be announced at the spring meeting.

For more information:
http://www.che.sc.edu/centers/cercas/