



CREATING A BRIGHT  
ENERGY FUTURE

GCEP at 10 Years

Global Climate & Energy Project  
STANFORD UNIVERSITY



# POSTERS

October 10, 2012

Ford Gardens, Frances C. Arrillaga Alumni Center

3:30 - 5:00 PM  
SESSION A

4:30 - 6:00 PM  
SESSION B

Poster Number	Poster Title
<b>3:30 - 5:00 pm - Session A</b>	
<b>CARBON-BASED ENERGY SYSTEMS</b>	
<b>1</b>	Continuous Passive-Seismic Monitoring of CO <sub>2</sub> Geologic Sequestration Projects <i>Sjoerd de Ridder, Biondo Biondi, Jason Chang</i>
<b>3</b>	Implications of the Rock Pore Microgeometry for the Movement and Chemical Reactivity of CO <sub>2</sub> in Carbonates <i>Stephanie Vialle, Jack Dvorkin, Gary Mavko</i>
<b>5</b>	Computer Simulation of the Precipitation of Dawsonite in the Caprock Induced by CO <sub>2</sub> Sequestration and the Response of Caprock Sealing Ability <i>Danqing Liu, Yilian Li, Guodong Yang, Ying Yu, Xin Ma, Qi Fang</i>
<b>7</b>	Simulation of Self-Limiting and Self-Enhancing Caprock Alteration Induced by CO <sub>2</sub> Sequestration Under the Convection-Diffusion Mechanism in Deep Saline Aquifers <i>Ying Yu, Yilian Li, Jianxing Dong, Danqing Liu</i>
<b>9</b>	Site Selection Approach of CO <sub>2</sub> Storage in Deep Saline Aquifers of China <i>Guodong Yang, Yilian Li, Danqing Liu, Ying Yu, Xin Ma, Qi Fang</i>
<b>11</b>	Design and Testing of Biomimetic Sorbents for CO <sub>2</sub> Capture <i>Jiajun He, Erik C. Rupp, J. Brannon Gary, John To, Jennifer Wilcox, T. Daniel P. Stack, Zhenan Bao</i>
<b>13</b>	Formation of a Si-Rich Layer on Olivine Surfaces During Carbonation Under <i>In-Situ</i> Conditions <i>Natalie C. Johnson, Burt Thomas, Kate Maher, Dennis K. Bird, Robert J. Rosenbauer, Gordon E. Brown, Jr.</i>
<b>15</b>	Natural CO <sub>2</sub> -Rich Waters in Iceland: A Natural Analogue for Geologic CO <sub>2</sub> Sequestration <i>Dana Thomas, Kate Maher, Dennis Bird, Stefan Arnorsson, Gordon Brown</i>
<b>17</b>	Unlimited Permeability Generation for Carbonation of Ultramafic Rocks <i>Pablo Garcia Del Real, Kate Maher, Dennis K. Bird, Gordon E. Brown</i>
<b>19</b>	Oxalate-Enhanced Geological CO <sub>2</sub> Storage on Serpentine <i>Seung-Hee Kang, Natalie C. Johnson, Burt Thomas, Kate Maher, Dennis K. Bird, Robert J. Rosenbauer, Gordon E. Brown, Jr.</i>
<b>21</b>	The Role of Counter-Current Flow in the Migration of CO <sub>2</sub> in Saline Aquifers <i>Mohammad Javaheri, Kristian Jessen</i>
<b>23</b>	Closed-loop Management of Carbon Storage Operations <i>David Cameron, Louis Durlafsky</i>

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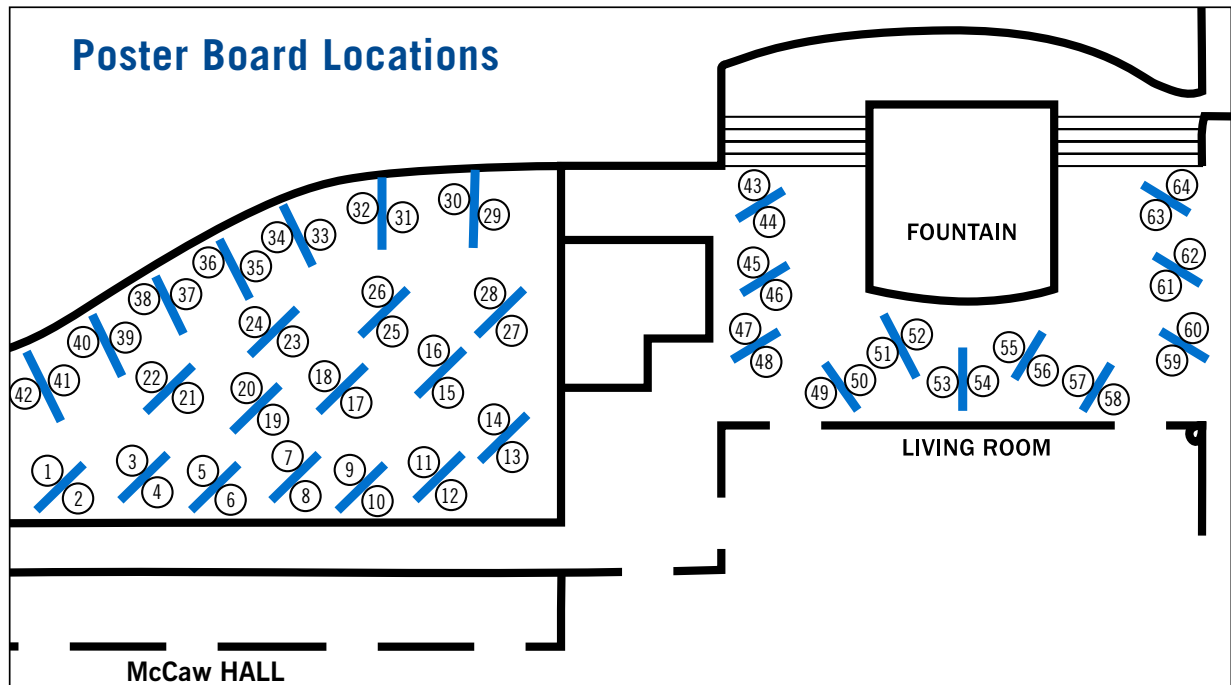
3:30 - 5:00 pm - Session A (continued)	
<b>BIOENERGY</b>	
25	Photobioelectrosynthesis <i>Holly Sewell, Svenja Lohner, Alfred Spormann</i>
27	Investigating the Molecular Mechanisms of Dwarfing in Lignin-Deficient Mutants <i>Nicholas D. Bonawitz, Clint Chapple</i>
29	Toward Maximizing Biomass Yield of Lignin-Modified Plants <i>Jeong Im Kim, Clint Chapple, Xu (Sirius) Li</i>
<b>SOLAR ENERGY</b>	
33	Light Trapping in Flexible GaAs Ultra Thin Film <i>Dong Liang, Yijie Huo, Yangsen Kang, Ken Xingze Wang, Anjia Gu, Zongfu Yu, Shuang Li, Shuang Wang, Shanhui Fan, Yi Cui, James S. Harris</i>
35	Solution-Processed Bulk Heterojunction Organic Solar Cells with Novel Acceptor Molecules <i>Jason T. Bloking, Andrew T. Higgs, Tommaso Giovannana, Xu Han, Andrew Ponec, Alan Sellinger, Michael D. McGehee</i>
37	Solid-State Photon-Enhanced Thermionic Emission <i>Samuel J. Rosenthal, Jared W. Schwede, Tomas Sarmiento, Yangsen Kang, James S. Harris, Zhi-Xun Shen, Nicholas A. Melosh</i>
39	Advantages of All-Back-Contact Design for Nanostructured Solar Cells <i>Sangmoo Jeong, Yi Cui</i>
41	Plasmonic Upconversion for Photovoltaics <i>Di M. Wu, Justin A. Briggs, Ashwin C. Atre, Alberto Salleo, Jennifer A. Dionne</i>
<b>ADVANCED ENERGY TRANSFORMATIONS AND STORAGE</b>	
43	Discovering Materials with Ultra-Low Work Functions for Energy Conversion Applications: Orbital-Overlap Model <i>Sharon Chou, Johannes Voss, Igor Bargatin, Frank Abild-Pedersen, Aleksandra Vojvodic, Piero Pianetta, Jens K. Nørskov, Roger T. Howe</i>
45	Thermionic Emission from Hot Metal Surfaces: A First Principles Study <i>Johannes Voss, Sharon Chou, Aleksandra Vojvodic, Igor Bargatin, Frank Abild-Pedersen, Piero A. Pianetta, Roger T. Howe, Jens K. Nørskov</i>
47	The Exploration of Heterogeneous Transfer Hydrogenation Catalysts as Electrocatalysts for Alcohol Oxidation <i>Antonio G. De Crisci, Benjamin N. Reinecke, Britt Hedman, Matthew W. Kanan, Thomas F. Jaramillo, Robert M. Waymouth</i>
49	Dynamic Models of GE DFAG Wind Turbine Model in Power System Toolbox <i>Felipe Wilches-Bernal, Joe Chow</i>
51	Improved Emission Functions for Generators, and How They Help Resolve a Controversy About the Emission Effects of Wind Power <i>Andrew Kindle, Kedaar Raman, Daniel Shawhan</i>
53	Semi-Definite Programming for Power Output Control in Wind Energy Conversion System <i>Zhiqiang Jin, Fangxing Li</i>
55	Distributed Automatic Generation Control with Wind Units using Flatness-Based Approach <i>Maryam Variani, Kevin Tomsovic</i>
57	Electrochemical Nitrogen Reduction <i>Thomas R. Veltman, Matthew W. Kanan</i>
59	Atomic Layer Deposited Tunnel Oxide for Water Oxidation on a Schottky Junction Anode <i>Andrew Scheuermann, Eric Newton, John Lawrence, Chris Chidsey, Paul McIntyre</i>
61	Net Energy Analysis of Renewable Energy Producers Firmed by Energy Storage <i>Charles Barnhart, Michael Dale, Sally M. Benson</i>
63	Wireless Power Transfer to Moving Vehicles <i>Xiaofang Yu, Torbjorn Skauli, Sunil Sandhu, Peter Catrysse, Shanhui Fan</i>

<b>4:30 - 6:00 pm - Session B</b>	
<b>CARBON-BASED ENERGY SYSTEMS</b>	
<b>2</b>	Real-Time Monitoring at CO <sub>2</sub> Sequestration Sites: Fast Data Assimilation and Risk Evaluation <i>Sivaram Ambikasaran, Judith. Y. Li, Eric F. Darve, Peter Kitanidis</i>
<b>4</b>	A Fast Data Assimilation Method for Real Time CO <sub>2</sub> Monitoring <i>Judith Yue Li, Sivaram Ambikasaran, Eric Darve, Peter Kitanidis</i>
<b>6</b>	Prospects for Development of a Sootless Diesel Engine by Use of Alcohol Fuels <i>Greg Roberts, Chris Edwards</i>
<b>8</b>	Co-Generation of Carbon-Free Hydrogen and Electricity from Coal in a Carbon Fuel Cell with Carbon Capture <i>Brentan Alexander, Gregory Armstrong, Reginald Mitchell, Turgut Gur</i>
<b>10</b>	The Influence of Capillary Entry-Pressure Representation on the Rate of CO <sub>2</sub> Solubility Trapping <i>Boxiao Li, Hamdi A. Tchelepi, Sally M. Benson</i>
<b>12</b>	Analytical Study of Effects of Flow Rate, Capillarity and Gravity on CO <sub>2</sub> / Brine Multiphase Flow System in Horizontal Corefloods <i>Chia-Wei Kuo, Sally M. Benson</i>
<b>14</b>	Experimental Investigation of Fractured Rock Permeability Hysteresis Behavior <i>Da Huo, Sally M. Benson</i>
<b>16</b>	Modeling and Investigation of the Influence of Capillary Heterogeneity on Multiphase Flow of CO <sub>2</sub> and Brine <i>Mike Krause, Sally M. Benson</i>
<b>18</b>	Capillary Heterogeneity in Sandstones Rocks During CO <sub>2</sub> / Water Core-Flooding Experiments <i>Ronny Pini, Sam Krevor, Sally M. Benson</i>
<b>20</b>	Micromodel Investigations of CO <sub>2</sub> Exsolution from Carbonated Water in Sedimentary Rocks <i>Lin Zuo, Changyong Zhang, Ronald W. Falta, Sally M. Benson</i>
<b>22</b>	Petrological Heterogeneities and their Impact on Multiphase Flow Properties in the Framework of CCS <i>Ferdinand F Hingerl, Ronny Pini, Sally M. Benson</i>
<b>BIOENERGY</b>	
<b>26</b>	Efficiency and Economic Analysis of Biomass with Carbon Capture and Sequestration <i>Lena Perkins, Christopher Field</i>
<b>28</b>	Engineering Enzymes for Hydrogen Production from Biomass <i>Sylvie Liong, Phillip R. Smith, James R. Swartz</i>
<b>30</b>	Evaluating Heterologous Ferredoxin NADPH Reductases for a Synthetic Pathway from Biomass to Hydrogen <i>Franklin Lu, Phillip R. Smith, Sylvie Liong, James R. Swartz</i>
<b>SOLAR ENERGY</b>	
<b>34</b>	Understanding Molecular Assembly During Printing Process for Organic Electronic Devices <i>Gaurav Giri, Julia Reinspach, Anthony Appleton, Alex Ayzner, Michael F. Toney, Zhenan Bao</i>
<b>36</b>	Sorting of Large-Diameter Carbon Nanotubes by Poly (Dithiafulvalene-Fluorene-Co-Terthiophene) for Thin Film Transistors and Solar Cells <i>Huilian Wang, Jianguo Mei, Peng Liu, Kristin Schmidt, Gonzalo Jiménez-Osés, Silvia Osuna, Lei Fang, Christopher J. Tassone, K. N. Houk, Michael F. Toney, Zhenan Bao</i>
<b>38</b>	Evaluation of Solution Processable Carbon Based Electrodes for all Carbon Solar Cells <i>Michael Vosgueritchian, Marc P. Ramuz, Peng Wei, Zhenan Bao</i>
<b>40</b>	Pressure Dependence of Lanthanide-Based Upconverting Nanoparticles <i>Michael Wisser, Maverick Chea, Di Wu, Alberto Salleo, Jen Dionne</i>

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**4:30 - 6:00 pm - Session B (continued)**

ADVANCED ENERGY TRANSFORMATIONS AND STORAGE	
<b>44</b>	Life Testing of LSM-YSZ Composite SOC Electrodes During Current-Switched Operation <i>Gareth A. Hughes, Kyle Yakal-Kremiski, Scott A. Barnett</i>
<b>46</b>	Thermodynamic Considerations for a Novel Solid Oxide Flow Battery System for Grid-Energy Storage <i>Chris Wendel, Robert Braun</i>
<b>48</b>	Model Validation and Performance Analysis of Solid Oxide Cells (SOCs) for a Novel Energy Storage <i>Pejman Kazemipoor, Robert Braun</i>
<b>50</b>	Sizing Advanced Flywheel Energy Storage <i>Clay Hearn, Robert Hebner, Michael Lewis, Siddharth Pratap, Fabian Uriate, Dongmei Chen, Raul Longoria</i>
<b>52</b>	Gas-Phase Azide Functionalization of Carbon: A Versatile Platform for Functionalized Materials <i>Eric Stenehjelm, Vadim R. Ziatdinov, Christopher E. D. Chidsey, T. Daniel P. Stack</i>
<b>54</b>	Electrochemical Reduction of CO <sub>2</sub> on Modified Gold Surfaces <i>Etosha R. Cave, Kendra P. Kuhl, David N. Abram, Toru Hatsukade, Thomas F. Jaramillo</i>
<b>56</b>	Hybrid Polymer-Metal Surfaces for Electrochemical CO <sub>2</sub> Reduction <i>David N. Abram, Kendra P. Kuhl, Etosha R. Cave, Thomas F. Jaramillo</i>
<b>58</b>	Electrochemical Reduction of CO <sub>2</sub> on Ag surfaces: Potential Dependence of Activity and Selectivity <i>Toru Hatsukade, Kendra P. Kuhl, Etosha Cave, David N. Abram, Thomas F. Jaramillo</i>
<b>60</b>	Electrochemical Reduction of Carbon Dioxide on Copper Metal <i>Kendra P. Kuhl, Etosha R. Cave, David N. Abram, Toru Hatsukade, Thomas F. Jaramillo</i>
<b>62</b>	First-Principles Calculations of Fischer-Tropsch Processes Catalyzed by Nitrogenase Enzymes <i>Joel B. Varley, Jens K. Nørskov</i>
<b>64</b>	A High Rate, Long Cycle Life Aqueous Electrolyte Battery <i>Mauro Pasta, Colin D. Wessells, Robert A. Huggins, Yi Cui</i>



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