

## *Curriculum Vitae*

### **Matthew W. Kanan**

Assistant Professor of Chemistry  
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#### **EDUCATION**

2000-2005: Harvard University  
Ph.D. Organic Chemistry  
*National Science Foundation Graduate Research Fellow*  
DNA-Templated Synthesis and Reaction Discovery  
1996-2000: Rice University  
B.A. Chemistry, *Summa Cum Laude, Phi Beta Kappa*

#### **PROFESSIONAL EXPERIENCE**

2009–present: Stanford University  
Assistant Professor of Chemistry  
2005-2009: Massachusetts Institute of Technology  
*National Institutes of Health Postdoctoral Research Fellow*  
Water-Oxidation Catalysis

#### **HONORS**

2015: Selected as one of first annual C&EN's Talented 12  
2014: Camille Dreyfus Teacher-Scholar Award  
2013: Hellman Faculty Scholar Award  
2012: Camille and Henry Dreyfus Environmental Mentor  
2010: Thieme Journal Award  
2009: Eli Lilly New Faculty Award

#### **PUBLICATIONS** (\* indicates corresponding author)

##### **Stanford**

13. "Carbon dioxide utilization via carbonate-promoted C–H carboxylation" Banerjee, A.; Dick, G. R.; Yoshino, T.; Kanan\*, M. W. *Nature* **2016**, *accepted*.
12. "Probing the active surface sites for CO reduction on oxide-derived copper electrocatalysts" Verdaguer-Casadevall, A.; Li, C. W.; Johansson, T. P.; Scott, S. B.; McKeown, J. T.; Kumar, M.; Stephens, I. E. L.; Kanan\*, M. W. & Chorkendorff\*, I. *J. Am. Chem. Soc.* **2015**, *137*, 9808-9811.
11. "Grain Boundary–Dependent CO<sub>2</sub> Reduction Activity" Feng, X.; Jiang, K.; Fan, S. & Kanan\*, M. W. *J. Am. Chem. Soc.* **2015**, *137*, 4606–4609.

10. “Pd-catalyzed electrochemical conversion of carbon dioxide to formate: high mass activity at minimal overpotential and identification of the deactivation pathway” Min, X. & Kanan\*, M. W. *J. Am. Chem. Soc.* **2015**, *137*, 4701–4708.
9. “Controlling H<sup>+</sup> vs CO<sub>2</sub> Reduction Selectivity on Pb Electrodes” Lee, C. H. & Kanan\*, M. W. *ACS Catalysis* **2015**, *5*, 465–469.
8. “Electrostatic Control of Regioselectivity via Ion Pairing in a Au(I)-Catalyzed Rearrangement” Lau, V. M.; Gorin, C. F. & Kanan\*, M. W. *Chem. Sci.* **2014**, *5*, 4975–4979.
7. “Alkaline O<sub>2</sub> Reduction on Oxide-Derived Au: High Activity and 4e<sup>-</sup> Selectivity without (100) Facets” Min, X.; Chen, Y. & Kanan\*, M. W. *Phys. Chem. Chem. Phys.* **2014** *16*, 13601–13604.
6. “Electroreduction of carbon monoxide to liquid fuel on oxide-derived nanocrystalline copper” Li, C. W.; Ciston, J. & Kanan\*, M. W. *Nature* **2014**, *508*, 504–507.
5. “Interfacial Electric Field Effects on a Carbene Reaction Catalyzed by Rh Porphyrins” Gorin, C. F.; Beh, E. S.; Bui, Q. M.; Dick, G. R. & Kanan\*, M. W. *J. Am. Chem. Soc.* **2013**, *135*, 11257–11265.
4. “Aqueous CO<sub>2</sub> Reduction at Very Low Overpotential on Oxide-Derived Au Nanoparticles” Chen, Y.; Li, C. W. & Kanan\*, M. W. *J. Am. Chem. Soc.* **2012**, *134*, 19969–19972.
3. “CO<sub>2</sub> Reduction at Low Overpotential on Cu Electrodes Resulting from the Reduction of Thick Cu<sub>2</sub>O Films” Li, C. W. & Kanan\*, M. W. *J. Am. Chem. Soc.* **2012**, *134*, 7231–7234.
2. “Tin Oxide Dependence of the CO<sub>2</sub> Reduction Efficiency on Tin Electrodes and Enhanced Activity for Tin/Tin Oxide Thin-Film Catalysts” Chen, Y. & Kanan\*, M. W. *J. Am. Chem. Soc.* **2012**, *134*, 1986–1989.
1. “An Electric Field-Induced Change in the Selectivity of a Metal Oxide-Catalyzed Epoxide Rearrangement” Gorin, C. F.; Beh, E. S. & Kanan\*, M. W. *J. Am. Chem. Soc.* **2012**, *134*, 186–189.

#### **Prior to Stanford**

10. “Mechanistic Studies of the Oxygen Evolution Reaction by a Cobalt-Phosphate Catalyst at Neutral pH” Surendranath, Y.; Kanan, M. W. & Nocera\*, D. G. *J. Am. Chem. Soc.* **2010**, *132*, 16501–16509.
9. “Structure and Valency of a Cobalt-Phosphate Water Oxidation Catalyst Determined by in Situ X-ray Spectroscopy” Kanan, M. W.; Yano, J.; Surendranath, Y.; Dincă, M.; Yachandra\*, V. K. & Nocera\*, D. G. *J. Am. Chem. Soc.* **2010**, *132*, 13692–13701.
8. “Cobalt-Phosphate Oxygen Evolving Compound” Kanan, M. W.; Surendranath, Y. & Nocera\*, D. G. *Chem. Soc. Rev.* **2009**, *38*, 109–114.
7. “In Situ Formation of an Oxygen-Evolving Catalyst in Neutral Water Containing Phosphate and Co<sup>2+</sup>” Kanan, M. W. & Nocera\*, D. G. *Science* **2008**, *321*, 1072–1075.
6. “Development and Initial Application of a Hybridization-Independent, DNA-Encoded Reaction Discovery System Compatible with Organic Solvents” Rozenman, M. M.; Kanan, M. W. & Liu\*, D. R. *J. Am. Chem. Soc.* **2007**, *129*, 14933–14938.

5. "Synthesis of Acyclic  $\alpha,\beta$ -Unsaturated Ketones Via Pd(II)-Catalyzed Intermolecular Reaction of Alkynamides and Alkenes" Momiyama, N.; Kanan, M. W. & Liu\*, D. R. *J. Am. Chem. Soc.* **2007**, *129*, 2230-2231.
4. "Reaction Discovery Enabled by DNA-Templated Synthesis and *In Vitro* Selection" Kanan, M. W.; Rozenman, M. M.; Sakurai, K.; Snyder, T. M. & Liu\*, D. R. *Nature* **2004**, *431*, 545-549.
3. "Multi-Step Small-Molecule Synthesis Programmed by DNA Templates" Gartner, Z. J.; Kanan, M. W. & Liu\*, D. R. *J. Am. Chem. Soc.* **2002**, *124*, 10304-10306.
2. "Expanding the Reaction Scope of DNA-Templated Synthesis" Gartner, Z. J.; Kanan\*, M. W. & Liu\*, D. R. *Angew. Chem. Int. Ed.* **2002**, *41*, 1796-1800.
1. "Facile Synthesis of a Fluorescent Deoxycytidine Analogue Suitable for Probing the RecA Nucleoprotein Filament" Singleton\*, S. F.; Shan, F.; Kanan, M. W.; McIntosh, C. M.; Stearman, C. J.; Helm, J. S. & Webb, K. J. *Org. Lett.* **2001**, *3*, 3919-3922.

#### **PATENT APPLICATIONS AND ISSUED PATENTS**

##### **Stanford**

- "Rapid Small-Volume Detection of Blood Ammonia" Veltman, T. R.; Tsai, C.; Kanan, M. W.; Chu, G. 61/938,467. Filed on February 11, 2014.
- "Catalysts for Low Temperature Electrolytic CO<sub>2</sub> or CO Reduction" Kanan, M. W.; Chen, Y.; Li, C. W. WO 2014018091. Filed January 30, 2014.
- "Catalysis Controlled by Interfacial Electric Fields" Gorin, C. F.; Beh, E. S.; Kanan, M. W. PCT/US2012/052142. Filed on August 23, 2012.

##### **Prior to Stanford**

- "Catalyst Compositions and Electrodes for Photosynthesis Replication and Other Electrochemical Techniques" Nocera, D. G.; Kanan, M. W. USSN 61/073,701.
- "Evolving New Molecular Function" Liu, D. R.; Gartner, Z. J.; Kanan, M. W. USSN 10/101,030. U.S. Patent #7070928.
- "Reaction Discovery System" Liu, D. R.; Kanan, M. W.; Rozenman, M. M. USSN 11/971,642.