

## CARL K. BROZEK

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1253 University of Oregon  
Lewis Integrated Science Building  
Eugene, Oregon 97403

541-346-4601  
cbrozek@uoregon.edu

### Professional Appointments

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|-------------------------------------------------------------------------|-----------------|
| Assistant Professor, University of Oregon                               | 06/2018–Present |
| Postdoctoral Fellow, University of Washington (Advisor: Daniel Gamelin) | 07/2015–05/2018 |

### Education

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|-------------------------------------------------------|---------------------------------------------------|
| Ph.D. in Inorganic Chemistry (Advisor: Mircea Dincă)  | Massachusetts Institute of Technology, June, 2015 |
| S.B. Honors in Chemistry (Advisor: Gregory Hillhouse) | University of Chicago, June, 2010                 |

### Awards and Honors

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| Young Investigator Award – ACS Division of Inorganic Chemistry   | 2016      |
| Alan Davison Prize (Best Inorganic Thesis) – MIT                 | 2015      |
| Washington Research Foundation Innovation Fellow in Clean Energy | 2015      |
| MIT School of Science Appreciation Award                         | 2015      |
| National Science Foundation Graduate Research Fellowship         | 2010–2014 |
| Beckman Scholars Program in Molecular Sciences Fellowship        | 2007–2009 |

### Publications

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\* denotes co-first-authorship

- (25) Araujo, J.; **Brozek, C. K.**; Kroupa, D.; Gamelin, D. R.; "Degenerately n-Doped Colloidal PbSe Quantum Dots: Band: Assignments and Electrostatic Effects." *Nano Lett.* **2018**, Just Accepted
- (24) **Brozek, C. K.**; Zhou, D.; Liu, H.; Li, X.; Kittilstved, K. R.; Gamelin, D. R. "Soluble Supercapacitors: Large and Reversible Charge Storage in Colloidal Fe-Doped ZnO Nanocrystals." *Nano Lett.* **2018**, 18, 3297.
- (23) Hartstein, K. H.; **Brozek, C. K.**; Hinterding, S. O. M.; Gamelin, D. R. "Copper-Coupled Electron Transfer in Colloidal Plasmonic Copper-Sulfide Nanocrystals Probed by in Situ Spectroelectrochemistry." *J. Am. Chem. Soc.* **2018**, 140, 3434.
- (22) Liu, H.\*; **Brozek, C. K.\***; Sun, S.; Lingerfelt, D. B.; Gamelin, D. R.; Li, X. "A Hybrid Quantum-Classical Model of Electrostatics in Multiply Charged Quantum Dots." *J. Phys. Chem. C* **2017**, 121, 26086.
- (21) **Brozek, C. K.**; Ozarowski, A.; Stoian, S. A.; Dincă, M. "Dynamic Structural Flexibility of Fe-MOF-5 Evidenced by <sup>57</sup>Fe Mössbauer Spectroscopy." *Inorg. Chem. Front.* **2017**, 3 782.
- (20) Carroll, G. M.; Tsui, E. Y.; **Brozek, C. K.**; Gamelin, D. R. "Spectroelectrochemical Measurement of Surface Electrostatic Contributions to Colloidal CdSe Nanocrystal Redox Potentials." *Chem. Mater.* **2016**, 28, 7912.
- (19) **Brozek, C. K.**; Hartstein, K. H.; Gamelin, D. R. "Potentiometric Titrations for Measuring the Capacitance of Colloidal Photodoped ZnO Nanocrystals." *J. Am. Chem. Soc.* **2016**, 138, 10605.
- (18) Carroll, G. M.; **Brozek, C. K.**; Hartstein, K. H.; Tsui, E. Y.; Gamelin, D. R. "Potentiometric Measurements of Semiconductor Nanocrystal Redox Potentials." *J. Am. Chem. Soc.* **2016**, 138, 4310.
- (17) Metzger, E. D.; **Brozek, C. K.**; Comito, R. J.; Dincă, M. "Selective dimerization of ethylene to 1-

- butene with a porous catalyst"  
*ACS Central Science* **2016**, 2, 148.
- (16) Akimbekov, Z.; Wu, D; **Brozek, C. K.**; Dincă, M.; Navrotsky, A. "Thermodynamics of Solvent Interaction with the Metal-Organic Framework MOF-5"  
*Phys. Chem. Chem. Phys.* **2016**, 18, 1158.
  - (15) **Brozek, C. K.**; Dincă, M. "Thermodynamic parameters of cation exchange in MOF-5 and MFU-4l"  
*Chem. Commun.* **2015**, 51, 11780.
  - (14) Bellarosa, L.; **Brozek, C. K.**; Garcia-Melchior, M.; Dincă, M.; López, N. "When the Solvent Locks the Cage: Theoretical Insight into the Transmetalation of MOF-5 Lattices and its Kinetic Limitations"  
*Chem. Mater.* **2015**, 27, 3422.
  - (13) **Brozek, C. K.**; Miller, J. T., Stoian, S. A.; Dincă, M. "NO Disproportionation at a Mononuclear Site-Isolated Fe<sup>2+</sup> Center in Fe<sup>2+</sup>-MOF-5"  
*J. Am. Chem. Soc.* **2015**, 137, 7495.
  - (12) **Brozek, C. K.**; Michaelis, V. K.; Ong, T.-C.; Bellarosa, L.; López, N.; Griffin, R. G.; Dincă, M. "Dynamic DMF binding in MOF-5 enables the formation of metastable cobalt-substituted MOF-5 analogs "  
*ACS Central Science* **2015**, 1, 252.
  - (11) Sheberla, D.; Sun, L.; Blood-Forsythe, M. A.; Er, S.; Wade, C. R.; **Brozek, C. K.**; Aspuru- Guzik, A.; Dincă, M. "High Electrical Conductivity in Ni<sub>3</sub>(2,3,6,7,10,11-hexaiminotriphenylene)<sub>2</sub>, a Semiconducting Metal-Organic Graphene Analogue"  
*J. Am. Chem. Soc.* **2014**, 136, 8859.
  - (10) **Brozek, C. K.**; Dincă, M "Cation Exchange at the Secondary Building Units of Metal-organic Frameworks"  
*Chem. Soc. Rev.* **2014**, 43, 5456.
  - (9) **Brozek, C. K.**; Bellarosa, L.; Soejima, T.; Clark, T. V.; Lopez, N.; Dincă, M "Solvent-Dependent Cation Exchange in Metal-organic Frameworks"  
*Chem.–Eur. J.* **2014**, 20, 6871.
  - (8) Kuppuswamy, S.; Powers, T. M.; Johnson, B. M.; **Brozek, C. K.**; Krogman, J. P.; Bezpalko, M. W.; Berben, L. A.; Keith, J. M.; Foxman, B. M.; Thomas, C. M. "One-electron Oxidation Chemistry and Subsequent Reactivity of Diiron Imido Complexes"  
*Inorg. Chem.* **2014**, 53, 5429.
  - (7) Cozzolino, A. F.; **Brozek, C. K.**; Palmer, R. D.; Yano, J.; Li, M.; Dincă, M. "Ligand Redox Non-innocence in the Stiochiometric Oxidation of Mn<sub>2</sub>(2,5-dioxidoterephthalate) (Mn-MOF-74)"  
*J. Am. Chem. Soc.* **2014**, 136, 3334.
  - (6) Kuppuswamy, S.; Bezpalko, M. W.; Powers, T. M.; Wilding, M. J. T.; **Brozek, C. K.**; C. K.; Foxman, B. M.; Thomas, C. M. "A Series of C<sub>3</sub>-Symmetric Heterobimetallic Cr/M (M = Fe, Co, and Cu) Complexes"  
*Chem. Sci.* **2014**, 5, 1617.
  - (5) **Brozek, C. K.**; Dincă, M. "Ti<sup>3+</sup>-, V<sup>2+/3+</sup>-, Cr<sup>2+/3+</sup>-, Mn<sup>2+</sup>-, and Fe<sup>2+</sup>-Substituted MOF-5 and Redox Reactivity in Cr- and Fe-MOF-5"  
*J. Am. Chem. Soc.* **2013**, 135, 12886.
  - (4) **Brozek, C. K.**; Cozzolino, A. F.; Teat, S. J.; Chen, Y.-C.; Dincă, M. "Quantification of Site-Specific Cation Exchange in Metal-organic Frameworks Using Multi-Wavelength Anomalous X-ray Dispersion"  
*Chem. Mater.* **2013**, 25, 2998.
  - (3) Kuppuswamy, S.; Powers, T. M.; Johnson, B. M.; Bezpalko, M. W.; **Brozek, C. K.**; Foxman, B. M.; Berben, L. A.; Thomas, C. M. "Metal-Metal Interactions in C<sub>3</sub>-Symmetric Diiron Imido Complexes

Linked by Phosphinoamide Ligands"

*Inorg. Chem.* **2013**, 52, 4802.

- (2) **Brozek, C. K.**; Dincă, M. "Lattice-Imposed Geometry in Metal-Organic Frameworks: Lacunary Zn<sub>4</sub>O Clusters in MOF-5 Serve as Tripodal Chelating Ligands for Ni<sup>2+</sup>" *Chem. Sci.* **2012**, 3, 2110.
- (1) Iluc, V. M.; Laskowski, C. K.; **Brozek, C. K.**; Harrold, N. D.; Hillhouse, G. L. "Monomeric and Dimeric Disulfide Complexes of Nickel(II)" *Inorg. Chem.* **2010**, 49, 6817.

#### Patents

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- (1) Dincă, M.; Metzger, E. M.; **Brozek, C. K.** "Compositions and methods for selective olefin oligomerization comprising metal-organic frameworks" **2016** – US Provisional Application 62/218,003.

#### Invited Seminars

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|-----------------------------------------------------|---------------------------------------------------------|
| (12) 255th National ACS Meeting, Inorganic Division | New Orleans LA, March <b>2018</b>                       |
| (11) Cornell University                             | Ithaca NY, February <b>2018</b>                         |
| (10) University of Colorado, Boulder                | Boulder CO, February <b>2018</b>                        |
| (9) University of California, Riverside             | Riverside CA, January <b>2018</b>                       |
| (8) Michigan State University                       | East Lansing MI, January <b>2018</b>                    |
| (7) University of Oregon                            | Eugene OR, December <b>2017</b>                         |
| (6) ETH-Zurich                                      | Zurich CH, November <b>2017</b>                         |
| (5) University of Washington                        | Seattle WA, January <b>2017</b>                         |
| (4) Princeton University                            | Princeton NJ, January <b>2017</b>                       |
| (3) California Institute of Technology              | Pasadena CA, January <b>2017</b>                        |
| (2) 252nd National ACS Meeting, Inorganic Division  | Philadelphia PA, August <b>2016</b>                     |
| (1) 8th Annual Mössbauer Symposium                  | Northeastern University, Boston MA, January <b>2015</b> |

#### Selected Press

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|-----------------------------------------------------------------|---------------------------------------|
| "MIT faculty share best practices in graduate student advising" | <i>MIT News</i> , <b>2015</b>         |
| "Advising communication"                                        | <i>Science Magazine</i> , <b>2015</b> |
| "Improving student advising"                                    | <i>Science Magazine</i> , <b>2015</b> |

#### Service Activities

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**Panelist:** 2016 NSF Graduate Research Fellowship Program National Science Foundation Reviewed fellowship applications for graduate studies in the chemical sciences.

**Founder and Chair:** Advising Initiative Graduate Student Council of MIT Negotiated with faculty, students, administrators, and institutional offices to compose and implement a Rights and Responsibilities for graduate students. Organized promotional events and other communication efforts to disseminate throughout MIT.

**Co-founder:** Alumni Committee on Student Life Department of Chemistry at MIT Assembled alumni who have demonstrated a long-standing commitment to the Department to spearhead programs that harness our outsider perspective and resources to improve graduate student life.