

## WORKSHOP #2

### Shining Synchrotron Light on Closing the Carbon Cycle

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**Location: Berkner Hall, building 488, conference room B**

Achieving net-zero goals targets by 2050 necessitates urgent realization of new technologies aimed at closing the anthropogenic carbon cycle. Currently, the carbon imbalance is largely driven by fossil fuel combustion in the pursuit of energy generation and chemical industry processes. The chemical industries of the future will become circular by means of efficient reutilization of waste carbon and energy consumption optimization. Synchrotron methods play a critical role in realizing the cutting-edge science for carbon circularity due to the ability to decipher complex chemical transformations by means of multimodal, in situ, and operando experiments combined with machine learning driven automation and advanced data analytics. This workshop will bring world leading experts to discuss key advances in chemical sciences that leverage emerging X-ray capabilities to elucidate and realize foundational science and technological advancements in closing the carbon cycle. We will engage the user community of NSLS-II to further support this theme as mandated by the US Department of Energy towards achieving net-zero.

Start Time (ET)	Title	Speaker (Affiliation)
9:15 – 9:30	Welcome	Qun Shen & Organizers, Brookhaven National Laboratory
09:30 - 10:00	From Captured CO <sub>2</sub> to Value-added Chemicals: A Photochemical Approach	Ksenija Glusac, University of Illinois at Chicago Argonne National Laboratory
10:00 - 10:30	Unlocking Structure-Activity Relationships in Catalysts for Sustainability Through Multiscale X-ray Characterization	Andrew Beale, University College London
10:30 - 11:00	Coffee Break	
11:00 - 11:30	Pathways for enabling a carbon neutral economy with CO <sub>2</sub> hydrogenation	Marc Porosoff, University of Rochester
11:30 -12:00	Understanding Structure-Property Relationships in Ion-Conducting Membranes for Efficient Electrosynthesis of Organic Chemical Commodities	Miguel Modestino, New York University
12:00 - 01:00	Lunch	
1:00 – 1:30	Thermodynamic analysis for CO <sub>2</sub> capture and reduction	Caroline Saouma, Virginia Tech
1:30 – 2:00	Illuminating Plastic Upcycling	Simon Bare, SLAC National Accelerator Laboratory
2:00 – 2:30	Emergent Mechanisms in Photoenzymatic Catalysis	Todd Hyster, Princeton University
2:30 – 3:00	Group Photo and Coffee Break	
3:00 – 3:45	Roundtable discussion	
4:00 – 5:00	Visiting NSLS-II beamlines	