

# Bringing Chemistry to Life podcast series

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## Season 4: Expanding Chemistry Perspectives Episode 8: The electrifying chemistry of the nitrogen cycle



### Episode abstract

Moving from a linear economy, where things are made, used and discarded, to a circular one, based on recycling and reuse, is one of the most important and difficult challenges for our society. Cracking this problem and moving to a more sustainable way of living, while maintaining or even improving living standards, is key for the future of our planet.

With Matthew Liu, we go back to topics discussed in Episode 6 of Season 1 to look at one of the most important chemical elements, nitrogen. Reducing atmospheric nitrogen to nitrates is fundamental to our modern world. Nitrogen reduction makes possible to feed billions of people globally and it provides some of the most fundamental building blocks of modern chemistry. At the same time, it is one of the most energy-intensive industrial processes, and its products, while essential and beneficial, eventually become environmental pollutants at the end of their lifecycle.

An old technology might be the key to change this landscape. Electrochemistry is going through a renaissance and it's a very promising tool to recover nitrogen and put it back into the economic circle. In our discussion with Matthew we discuss some breakthrough and novel electrochemical approaches, electrocatalysis in particular, and how they can impact the economy of developed and under-developed countries.

### About our guest

#### Matthew Liu, PhD Candidate

Department of Chemical Engineering  
Stanford University

Matthew's Group Site: <https://www.tarpehlab.com/>

### Matthew's Recent Publications:

- [Catalytic Performance and Near – Surface X-Ray Characterization of Titanium Hydride Electrodes for the Electrochemical Nitrate Reduction Reaction](#)
- [Building an operational framework for selective nitrogen recovery via electrochemical stripping](#)
- [Aerosol Fragmentation Driven by Coupling of Acid-Base and Free-Radical Chemistry in the Heterogeneous Oxidation of Aqueous Citric Acid by OH Radicals](#)

### Matthew's Content Recommendations:

- [March Comes in Like a Lion](#), anime enjoyed by Matthew
- [Every Frame a Painting](#), a YouTube Series about filmmaking
- [Hasan Minaj: Homecoming King](#), a stand-up comedy special
- [Last Week Tonight with John Oliver](#), a current events program
- [The First Fifteen Lives of Harry August](#), a novel by Claire North

This podcast series is available via the following links



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