

## **Report on Ion Exchange Training Completed at the Tarpeh Lab**

A key step in Banyu Carbon's marine carbon removal process requires acidifying seawater to enable carbon dioxide extraction. This process is achieved by transferring acidity from a photoacid stream to seawater while keeping the photoacid separate from seawater to prevent its discharge to the ocean and to facilitate its reuse. Another key step is returning seawater to a natural pH after acidification and carbon dioxide removal to prevent negative impacts to marine environments. Transferring acidity to and from seawater essentially involves moving protons, which are positively charged ions, between a photoacid stream and seawater. Therefore, these steps can be facilitated by various ion exchange materials. The Tarpeh Lab at Stanford University has expertise in using ion exchange materials for selective separations in complex aqueous streams. During my training in the Tarpeh Lab, I conducted batch and continuous experiments with multiple ion exchange materials and set up data analysis spreadsheets to calculate key performance metrics, while completing readings to build up my conceptual understanding of ion exchange processes. These activities prepare me to be Banyu Carbon's in-house ion exchange expert, evaluating materials, designing reactors, and establishing operating procedures to facilitate scaling up marine carbon removal.

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