

Project at Lawrence Berkeley Lab

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Summary

From August to December I worked at the Lawrence Berkeley National Lab in Berkeley California. I joined Jeff Urban's group, which is part of the inorganic chemistry facility of the molecular foundry. The focus of the project was set on seawater desalination by the means of forward osmosis, using superparamagnetic iron oxide nanoparticles that are coated with a thermoresponsive polymer.



The molecular foundry in the Berkeley hills

While this type of, so called, draw solute had already been proven to work, my project focused on finding a different way of grafting the polymer onto the iron oxide nanoparticle. The method I decided on using is the ligand exchange of the nanoparticles oleic acid coat with a catechol bearing RAFT agent. This RAFT agent is then used as an anchor for the polymer grown onto it by RAFT polymerisation.

While the start of the project was a little slow, once everything was outlined I moved quickly and got a lot of work done, synthesising the RAFT agent's precursors. Unfortunately during one of the synthesis' the yield was not ideal and in the end I had very little of my wanted RAFT agent. By now, my project was already close to being over and one of the last things I could show was that the ligand exchange worked successfully. I did not have enough product to prove that the polymerisation also works, showing that RAFT polymerisation is a good and simple way of making a dense polymer shell.

While the project itself might have not been a huge success, it turned out to be a very good way for me to be more independent in science and design an own experiment from the beginning. Jeff Urban purposefully gave me a lot of space to find the right thing to work on in his group, but was still there when needed and so was all of his group and all the associated groups from the facility. I can highly recommend other nano students from Basel to seek out research groups at Berkeley lab or UC Berkeley to work on exciting science for the future.

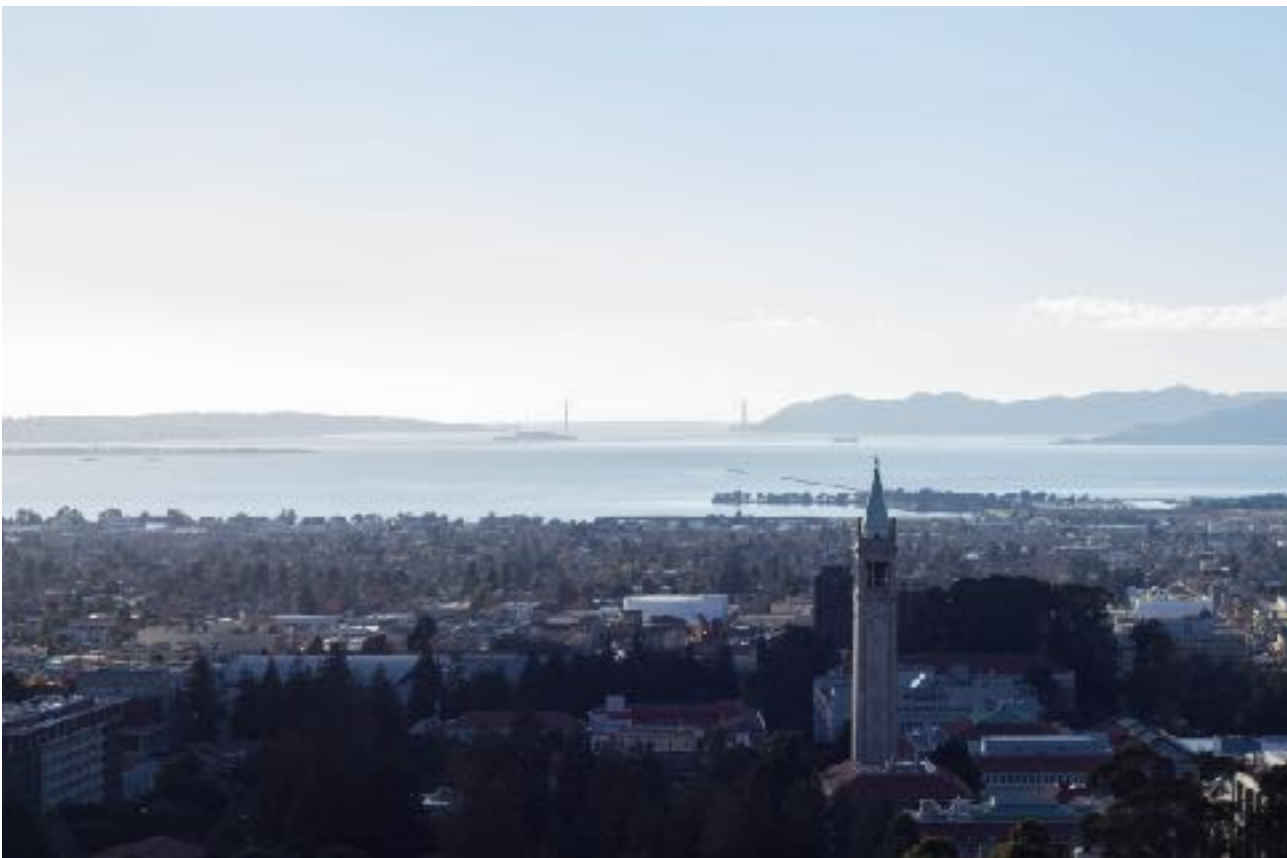
Living in Berkeley is also a great experience. What I really appreciated about Berkeley was living so close to a big city, San Francisco on one side, but just up the Berkeley hills you enter the Tilden regional park, that offers plenty of nature and incredible views of the San Francisco bay area. In general there are many nature recreation areas around the bay area offering a nice time off from work and the busyness of the city.

Culturally you obviously have San Francisco a 20 minute train ride away with all it's museums, beautiful neighbourhoods and history. On the other side of the bay, bordering Berkeley you have Oakland, another bigger city, which offers a slightly grungier feel and is cheaper than San Francisco, but not any less interesting.

Following some pictures from Berkeley and the bay area.



A sunset over the golden gate bridge, seen from the molecular foundry



Berkeley and the UC campus



The campanile and Doe library on the UC Berkeley campus



Alcatraz and the golden gate bridge seen from treasure island