Diploma work for master students

Designing a Multifunctional Chromatography Stationary Phase for (Bio)Product Purification via Green Chemistry

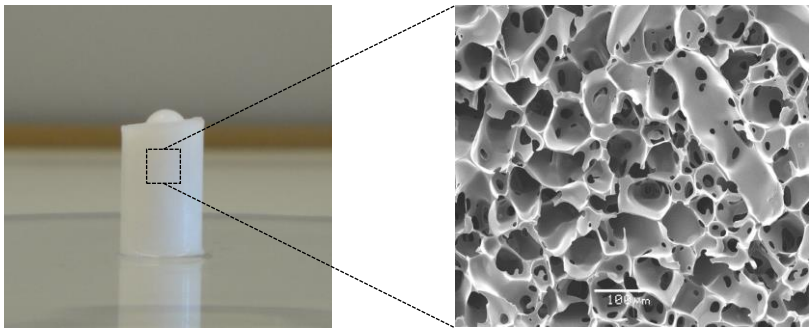
Did you ever imagine that you could create polymers at temperatures below freezing? It's a pretty cool process called cryogelation, and it results in a polymeric structure, known as cryogel, that looks like a sponge under the microscope—super elastic too, like a sponge! These large pores in the network make it incredibly versatile for applications in biotechnology, like purifying proteins, creating bioreactors, tissue engineering, and delivering drugs.

In our project, we're diving into the exciting world of cryogels. We will craft these polymeric matrices using proteins and enzymes as catalysts, and we're not stopping there. We're bringing in cutting-edge techniques like the living polymerization approach to gain control over the material's formation at the molecular level. In this phase, we'll also learn how to analyze our materials using tools like electron microscopy, Fourier Transform Infrared Spectroscopy (FTIR), and elemental analysis.

In the second part of our project, we will treat our cryogel with a series of reactions. This treatment will allow us to introduce (bio)ligands/adsorbents onto its surface. So we can create a continuous affinity chromatography column for all your downstream processing and purification needs. We'll thoroughly test this designed affinity column, checking its binding capacity, mechanical properties, and other physical characteristics using various analytical instruments.

So, suppose you're a master's student looking for a project that combines cutting-edge science with hands-on experimentation. In that case, this project will suit you perfectly, a window to the world of biotechnology and polymer science simultaneously.

For more information on the project, please contact Solmaz.hajizadeh@tbiokem.lth.se



Digital photo of cryogel (left); Digital image of scanning electron microscopy (SEM) of cryogel (right)