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Highly porous bio-based nanofibrous aerogels for removing cationic dyes from aqueous solutions

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The use of synthetic dyes in different industries such as paper, textile, paint, printing, and plastics is inevitable. Environmental concerns due to their UV and temperature stability together with their inhibiting effects on photosynthetic activities ask for improved dye removing processes. Dye adsorption is a promising method in dye removing process, as it is cost efficient, easy and flexible without any new toxic by-products. Difficulties such as separating the adsorbent after the removal process together with their low efficiency were overcome by the development of new adsorbents based on electrospun nanofiber membranes. However, besides all the outstanding properties of electrospun nanofiber membranes such as their huge specific surface area tailored surface functionality and fiber uniformity, they are still facing challenges such as low mechanical stability and unfavorable mass transport properties. To overcome these problems, a robust 3D sponge like aerogel with high porosity, mechanical stability, and flexibility as well as low density was developed using pullulan: nanofibers are electrospun from the natural and edible polysaccharide pullulan followed by cutting in dioxane, proceeding with a freeze casting process and finally thermally crosslinked [1]. The pullulan based super elastic and environmentally friendly aerogel is used as a highly efficient adsorbent to remove cationic dyes from aqueous solutions. Dye adsorption is pH dependent and recycling of the aerogel adsorbent is demonstrated.

Biography

Sara Mousavi is from Zhaw, Switzerland

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