

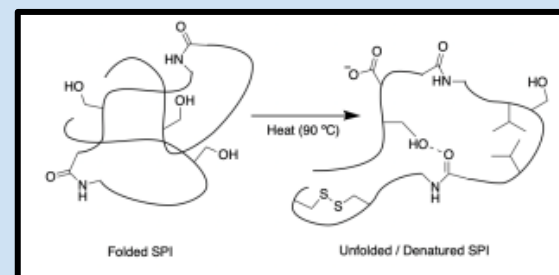
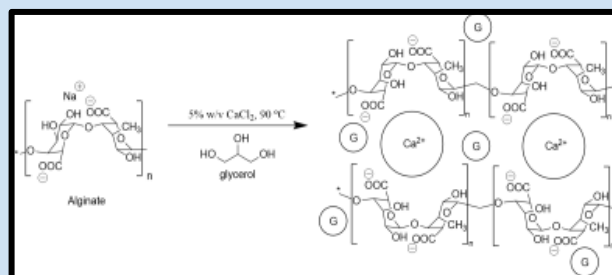
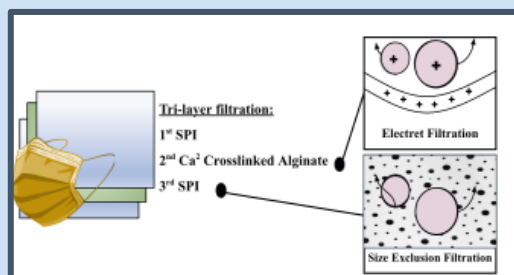
Biodegradable Face Covering Design & At-Home Synthesis

Elizabeth Karlsson; Gaa-Hou Hu, Chemistry

ABSTRACT. High demand for N95 and surgical masks made of non-biodegradable petroleum-based materials due to SARS-COV-2 challenges the recycling industry and proves unsustainable. Alginate film and soy sheet, elastic fibrous natural products, are ideal alternatives for their filtration and comfort. We report a design in which stacking Calcium(II) crosslinked alginate films with soy-protein-isolate (SPI) sheets to attain electro-static and size-exclusion filtration that can be achieved with an at-home synthetic strategy.

DESIGN

Alginate layer: electret filtration & size exclusion, > 50-300 nm particles; Soy layer: pre-filter & comfort



RESULTS

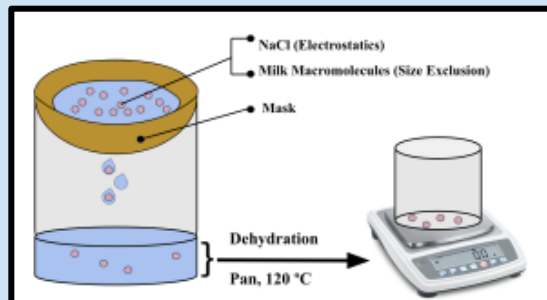
Table 1. Size-exclusion filtration efficiency.

Filters	% Average Filtered Weight	Standard Deviation	% Filtered Weight < 130 nm
N95	33.86	2.33	5.30
SPI/Alg	49.41	12.22	20.85

Table 3. Electrostatic filtration efficiency.

Filter	% Average Filtered Weight	Standard Deviation
N95	57.92	4.80
SPI/Alg	23.66	3.58

- SPI/ Alg Mask filters more efficiently than N95
- SPI/ Alg has smaller pores
- Highlights Breathability



FURTHER INFORMATION.

Please email phw@unc.edu or ljsakar@live.unc.edu for full manuscript.

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