



Search ScienceDirect

- Outline
- Highlights
- Abstract
- Graphical abstract
- Keywords
- 1. Introduction
- 2. Experimental
- 3. Results and discussion
- 4. Conclusion
- CRediT authorship contribution statement
- Declaration of Competing Interest
- Acknowledgement
- References
- Show full outline

Figures (13)



Separation and Purification Technology  
Volume 250, 1 November 2020, 117147



## The influence of alumina particle size on the properties and performance of alumina hollow fiber as support membrane for protein separation

Dajang Norhafizah Awang Chee <sup>a,\*</sup>, Ahmad Fauzi Ismail <sup>b</sup>, Farhana Aza <sup>c</sup>, Mohamed Afzal Mohamed Amin <sup>d</sup>, NorFadzana Abdullah <sup>e</sup>

- <sup>a</sup> Advanced Membrane Technology Research Centre (AMTEC), School of Chemical and Energy Engineering, Faculty of Engineering, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor Darul Takzim, Malaysia
- <sup>b</sup> Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia
- <sup>c</sup> Department of Chemical Engineering, Faculty of Engineering, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia

Received 22 December 2019; Revised 15 May 2020; Accepted 20 May 2020; Available online 23 May 2020.



Show less

+ Add to Mendeley Share Cite

<https://doi.org/10.1016/j.seppur.2020.117147>

Get rights and content

Recommended articles

- Carbon nanofiber/cementitious composites: Effect of debulking ...  
Cement and Concrete Composites, Volume 36, 2013, p...
- Download PDF View details
- Comparative study on adsorption and desorption effects of carb...  
Journal of Molecular Liquids, Volume 268, 2018, pp. 1...
- View details
- In situ growth of carbon nanotubes/carbon nanofibers on ceme...  
Construction and Building Materials, Volume 49, 2013...
- View details

1 2 Next

Citing articles (3)

Article Metrics

Citations

Citation Indexes: 3

Captures

Readers: 13



Search ScienceDirect

Abstract

The advantages offered by ceramic membranes compared to the polymeric membrane have attracted more interest, especially in fluid separation application owing to its ability to withstand harsh operating conditions. In this study, five alumina hollow fiber membranes were prepared from different loading ratios of alumina particle sizes which are 1  $\mu\text{m}$ , 0.5  $\mu\text{m}$ , and 0.01  $\mu\text{m}$ . The membranes were prepared via phase-inversion technique using water as an external and internal coagulant and sintered at 1400  $^{\circ}\text{C}$ . The effect of the alumina powder particle sizes on membrane morphology, pore size distribution, mechanical strength, surface roughness, pure water flux, and Bovine Serum Albumin (BSA) rejection was investigated in this study. By varying the overall loading and particle size of alumina, different morphologies of membranes were obtained. Higher loading of coarse particles produced more porous and low mechanical strength membranes, whereas reducing the amount of coarse particles produced a more compact membrane with the highest mechanical strength of 27 MPa. Meanwhile, BSA rejection is declining when more coarse particles were used to fabricate the membrane. Among all the membranes, the 5:3:2 ratio able to reject up to 66% of protein (BSA) with the flux of 138.7  $\text{L m}^{-2} \text{h}^{-1}$ .