



3rd GCET_2017

Effect of Gas Foaming and Porosigen Techniques on the Properties of Superporous Hydrogels

Najahusna Adnan, Leong Shu Qing, Suriati Ghazali, and Nureen Noordin

Faculty of Chemical & Natural Resources Engineering University Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Kuantan, Pahang, Malaysia.

Abstract

Hydrogels is a type of hydrophilic polymers which exist in three dimension network that absorb significant amount of water. However, most of the dried hydrogels take long time to be swollen, which limits their applications. In order to overcome this problem, superporous hydrogels (SPHs) which are novel hydrogel materials that can exhibit fast swelling and superabsorbent properties was introduced. As the SPHs foaming techniques influenced the morphology, swelling behavior and structure of the SPHs, this research was mainly focused to study on the effect of the two different foaming techniques (gas blowing and porosigen technique) on the physical and swelling properties of the SPHs. In the preparation of SPHs, the cross linking polymerization reaction was used to prepare poly-(acrylic acid-co-acrylamide) SPHs by using monomers of acrylic acid (AA), and acrylamide (AM). Besides that, the swelling ratio was determined in order to investigate water absorbency properties of SPHs on both techniques. The final products were characterized by using Scanning Electron Microscopy (SEM) and Fourier Transform Infrared Spectroscopy (FTIR), respectively. Based on the results, the SPHs prepared by gas blowing technique had shown higher water absorbency value, Q which is 194.13 ± 2.43 (g/g) compared with the SPHs prepared by porosigen technique which is 176.31 ± 1.30 (g/g). The formation of various size pores in or between the structures SPHs allowing the penetration of water into the SPHs structure. Based on FTIR results, both SPHs had same types of bond which are O-H, C=C, N-H, C-H, C-O, and C=O that corresponding to the swelling properties of SPHs. In conclusion, SPHs prepared by gas blowing technique gave better performance on water absorbency than SPHs that prepared by porosigen technique.

© 2018 Elsevier Ltd. All rights reserved.

Selection and/or Peer-review under responsibility of The 3rd International Conference on Green Chemical Engineering and Technology (3rd GCET): Materials Science, 07-08 November 2017.

Keywords: Hydrogels; Superporous Hydrogels; Gas Blowing; Porosigen; Swelling Properties
