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Radiation synthesis and characterization of super-absorbing hydrogel from natural polymers and vinyl monomer

Tran Thu Hong, Hiroataka Okabe, Yoshiki Hidaka, Kazuhiro Hara



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RADIATION SYNTHESIS AND CHARACTERIZATION OF SUPER-ABSORBING HYDROGEL FROM NATURAL POLYMERS AND VINYL MONOMER

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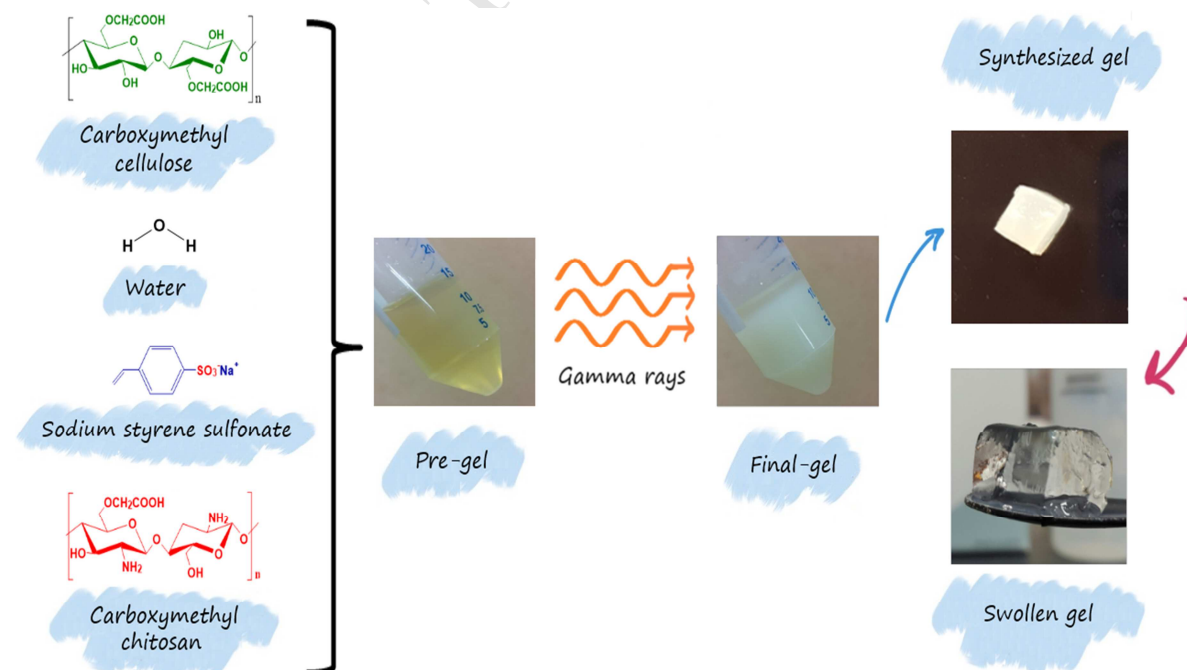
Tran Thu Hong^{1,2*}, Hiroataka Okabe¹, Yoshiki Hidaka¹, Kazuhiro Hara¹¹Department of Applied Quantum Physics and Nuclear Engineering, Faculty of Engineering, Kyushu University, 744 Motoooka, Fukuoka 819-0395, Japan²Nuclear Research Institute, Vietnam Atomic Energy Institute (VINATOM), 01 Nguyen Tu Luc, Dalat, Lam Dong, Vietnam* Corresponding author: hong@athena.ap.kyushu-u.ac.jp

Abstract

This article exploits a new approach for synthesis of polysaccharide-based grafted sodium styrene sulfonate (SSS) super absorbent hydrogels (SAHs) in aqueous solution by γ -radiation under ambient conditions. Important optimal conditions for preparation of hydrogels with the best swelling ratio, such as gamma irradiation dose and the ratio of feed composition have been discussed. Characterization techniques such as the SEM/EDS, FTIR and DSC were used in describing the newly prepared hydrogels. The FTIR gave characteristic peaks for $-\text{SO}_3\text{Na}$ group at 1042 and 988 cm^{-1} , showing successful grafting of SSS onto the polysaccharide base material. The dependence of swelling behaviors in various pH solutions and salts solutions were investigated in detail. The prepared hybrid hydrogel showed most optimum swelling capacity at neutral pH whereas equilibrium swelling of SAHs was achieved within 5 hours. The swelling of SAHs influenced obviously to metal ion removal percentage in solution.

Key words: Super –absorbent hydrogels; grafting; γ -radiation; polysaccharides, swelling kinetics, metal removal

Graphic abstract



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