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IMPROVED PERMEABILITY AND ABSORPTION OF SUPERABSORBENT POLYMERS BY USING ETHYLENE GLYCOL DIGLYCIDYL ETHER AS A SURFACE CROSS-LINKING AGENT

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Superabsorbent polymers (SAPs) are special polymeric materials that can absorb large amounts of water, saline solutions or physiological fluids as high as 10-1000 times their own weight due to a considerable number of hydrophilic groups in their structure. Recently, a major research trends of SAPs are the relaxation of the gel-blocking phenomenon. Surface cross-linking reduces gel-blocking and improves absorbency under load (AUL). In this study, surface cross-linking was achieved through thermal ring-opening reaction with ethylene glycol diglycidyl ether (EGDGE) as a cross-linking agent. We prepared carboxylated vinyl monomer based SAPs with comonomer. However, the SAPs have low absorption capacity under load (AUL) and low permeability. When EGDGE is used for surface cross-linking agent, the SAPs formed core-shell structure with different cross-linking densities between the exterior and interior. As a result, AUL and permeability of surface cross-linked SAPs were improved. We measured the absorption properties of the surface cross-linked SAPs according to the EGDGE input content, ratio of co-medium, reaction temperature and reaction time

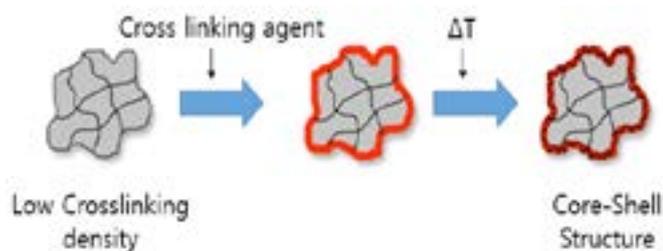


Figure 1: Formation of Core Shell by Surface Crosslinking

Recent Publications

1. Zohouriaan Mehr M J and Kourosh Kabiri (2008) Superabsorbent polymer materials: a review. *Journal of Applied Polymer Science*. 17(6):451-447.
2. Zohouriaan Mehr M J et al. (2010) Advances in non-hygienic applications of superabsorbent hydrogel materials. *Journal of Materials Science* 45(21):5711-5735.
3. Jockusch Steffen et al. (2009) Photoinduced surface crosslinking of superabsorbent polymer particles. *Journal of Applied Polymer Science*. 111(5):2163-2170.
4. Moini Nasrin et al. (2016) Simple and efficient approach for recycling of fine acrylic-based superabsorbent waste. *Polymer Bulletin*. 73(4):1119-1133.
5. Moini Nasrin and Kourosh Kabiri (2015) Effective parameters in surface cross-linking of acrylic-based water absorbent polymer particles using bisphenol A diethylene glycidyl ether and cycloaliphatic diepoxide. *Iranian Polymer Journal*. 24(11):977-987.

Biography

Wooseung Shin majored in Chemistry from Incheon National University in the Republic of South Korea. During his college years, he worked as an Intern Researcher at the Korea Institute of Industrial Technology (KITECH) and conducted research on tire tread rubber. He is a graduate student in the Department of Materials Science and Chemical Engineering of Hanyang University, Republic of South Korea and also a Researcher in KITECH. He is currently studying SAP's surface cross-linking processes to improve the absorption properties and permeability of the SAPs.

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