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Synthesis, characterization and swelling behavior of silver nanoparticles containing superabsorbent based on grafted copolymer of polyacrylic acid/ Guar gum

Jagdeep Singh, A.S. Dhaliwal

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2	nanoparticles containing superabsorbent based on grafted copolymer
3	of Polyacrylic acid/ Guar gum
4	Jagdeep Singh and A. S. Dhaliwal [*]
5	Department of Physics, Sant Longowal Institute of Engineering and Technology, Longowal
6	148106, Punjab, India
7	*Corresponding author: Prof. A.S. Dhaliwal
8	Email: dhaliwalas@hotmail.com, Fax: +911672253186
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10 ABSTRACT

Silver nanoparticles containing superabsorbent nanocomposite based on grafted copolymer of 11 Guar gum/polyacrylic acid (GG/Poly(AA)) have been are synthesized by two step free radical 12 13 graft copolymerization using ammonium persulphate (APS) as initiator and N, N'methylenebisacrylamide (MBA) as cross-linking agent. The synthesized nanocomposite 14 superabsorbent is characterized using various analytical techniques, such as, ultraviolet-visible 15 16 spectroscopy, Fourier transformed infrared spectroscopy, X-ray diffractometry, Field Emission Scanning Electron Microscopy, Energy dispersive X-ray spectroscopy and thermal gravimetric 17 analysis. The UV-vis, EDX and XRD studies revealed that silver nanoparticles (AgNPs) are 18 successfully incorporated inside the polymer of GG/Poly(AA). The grafted crosslinking of 19 backbone guar gum with acrylic acid and incorporation of silver nanoparticles are confirmed 20 21 from the FTIR spectrogram. In addition to this, effect of several synthesis parameters, such as, concentration of guar gum, concentration of monomer, initiator and cross-linker are also 22 studied. Furthermore, under optimized reactions conditions the influence of several 23 24 parameters like pH, temperature and time on swelling behavior of superabsorbent 25 nanocomposite is studied in double deionized water and found to be 1700 %. The swelling 26 behavior of nanocomposite has been also inspected in various saline solutions. It is evident that 27 the AgNPs/GG/Poly(AA) nanocomposite superabsorbent may be used for water absorption purpose in many applications. 28

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