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(54) Title of the invention : A HYDROGEL NANOCOMPOSITE BASED ON POLYACRYLAMIDE (PAM) AND PREPARATION METHOD THEREOF

(51) International classification :A61L0027520000, A61L0027380000, C02F0001560000, C08L0033260000, C01B0021064000 (86) International Application No :NA Filing Date :NA (87) International Publication No : NA (61) Patent of Addition to Application Number :NA Filing Date :NA (62) Divisional to Application Number :NA Filing Date :NA		(71)Name of Applicant : 1)Manipal University Jaipur Address of Applicant :Manipal University Jaipur, Off Jaipur-Ajmer Expressway, Post: Dehmi Kalan, Jaipur-303007, Rajasthan, India Jaipur ----- Name of Applicant : NA Address of Applicant : NA (72)Name of Inventor : 1)Dr. Shikha Awasthi Address of Applicant :Department of Chemistry, School of Basic Sciences, Manipal University Jaipur, Jaipur – 303007, Rajasthan, India Jaipur ----- 2)Dr. Sarvesh Kumar Pandey Address of Applicant :6/36, Maulana Azad National Institute of Technology, Bhopal-462003, Madhya Pradesh, India Bhopal ----- 3)Hulikere Jagdish Shwetha Address of Applicant :Balaji's lakeside Marvel, BHCS layout, Utharahalli, Bengaluru- 61 - 560061, Karnataka, India Bangalore ----- 4)Nehal Address of Applicant :Department of Chemistry, School of Basic Sciences, Manipal University Jaipur, Jaipur – 303007, Rajasthan, India Jaipur ----- 5)S. Selvaraj Address of Applicant :Dr. S. Selvaraj, S/O Mr. C. Sankar, No. 2/265, Koothandavar Kovil Street, Veeralur (Village and Post), Kalasapakkam (Taluk), Tiruvannamalai (District), Pincode: 606901. Tamil Nadu, India. Tiruvannamalai ---
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(57) Abstract :

The invention discloses a hydrogel nanocomposite based on polyacrylamide (PAM) and preparation method thereof. The hydrogel nanocomposite comprises polyacrylamide (PAM) as a basic material, with 0.1-0.5 wt. % of silver (Ag) and 0.1-0.5 wt. % hydroxylated boron nitride (BNOH). According to the preparation method, the initial phase involves synthesizing Ag nanoparticles, functionalizing hexagonal boron nitride (hBN), and preparing dimer hydrogel composites. Building on the Ag nanoparticles and hydroxylated boron nitride (BNOH), a hydrogel trimer composite is then created by considering the hydrophilicity, degradation behavior, and compressive strength of the dimer composites, while incorporating the desiccated mass of neat PAM hydrogel into a mixture containing the selected optimal concentrations of 0.1-0.5 wt. % of silver (Ag) and 0.1-0.5 wt. % boron nitride (BNOH). As a result, the hydrogel composite that has been fabricated is a biomaterial that is highly promising for the regeneration of soft tissues, particularly articular cartilage. This research paves the way for developing self-healing, intelligent nanocomposites with a wide range of applications in cartilage tissue engineering. The present invention developed self-healing, intelligent nanocomposites with a wide range of applications in cartilage tissue engineering.

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