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High-performance smart biomaterial containing nanoparticles and ophthalmic application

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This research was conducted to create a functional hydrogel ophthalmic lens containing nanoparticles. Carbon nanoparticles and PEGMEMA were used as additives and were copolymerized with HEMA (2-hydroxyethyl methacrylate) and EGDMA (ethylene glycol dimethacrylate), which are widely used as contact lens materials and AIBN (azobisisobutyronitrile), which is an initiator. The hydrogel lens was produced using a cast-mold method, and the materials were thermally polymerized at 100° C for an hour. The polymerized lens sample was hydrated in a 0.9% saline solution for 24 hours before the optical and physical characteristics of the lens were measured. The basic properties of the contact lenses such as refractive index, light transmittance, tensile strength, breaking strength, water content and wettability were subsequently evaluated. To verify the mixing state of the nanoparticles, the surface was analyzed using scanning electron microscopy (SEM). The addition ratios of carbon nanoparticles and PEGMEMA, a hydrophilic substance, were varied as 0.1 ~ 0.2% and 1 ~ 20%, respectively, to investigate their usability as materials for high-performance contact lenses. Carbon nanoparticles have the function of coloring the entire contact lens in gray due to the inherent color of the particles, they can substitute the function of the tinted lens in addition to providing the UV blocking function.

Biography

Min-Jae Lee has completed his M.S from Kangwon National University and He is the staff of Bio-material project in Daegu Catholic University. He has published more than 10 papers in reputed journals and has been serving as an instructor for 2years.

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