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High functional materials containing carbon nanoparticles and hexamethylene diisocyanate for hydrogel ophthalmic lens

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The development of ophthalmic lens materials has been consistently attempted to reduce these side effects and foreign body sensation. The basic properties that ophthalmic lenses should have are comfortable fit and wettability, which greatly affect the ophthalmic side effects. Ophthalmic lenses can be evaluated based on their basic physical and optical properties, such as their water content, light transmittance, wettability, and oxygen permeability. The roughness of the carbon surface is also known to greatly influence the wettability of the material. The wettability can be improved through various surface treatments. The isocyanate material that was used in this experiment is known to increase the degree of crosslinking and to improve the mechanical properties when it reacts with polyuria; thus, it is widely used as an adhesive, a hardener, and the like. This study aimed to manufacture a high-wettability and high-strength ophthalmic lens by adding HDI and carbon nanoparticles at various ratios into the basic-combination Ref. prepared using HEMA, a base polymer used as a material for hydrophilic ophthalmic lenses; EGDMA, a crosslinking agent; and AIBN, an initiator. And also, the physical properties (i.e., refractive index, water content, contact angle, light transmittance, tensile strength, breaking strength, and absorbance) were measured. When HDI and carbon nanoparticles were added, the water content decreased but the tensile and breaking strengths increased, along with the wettability, according to the carbon nanoparticle addition ratio. In particular, when two additives were used together, the strength increased due to the interaction between the HDI and carbon nanoparticles.

Biography

A-Young Sung has conducted academic research at Harvard University and Oxford University as a visiting professor. She is the vice president of Society for Korea Standards Certification and safety. She has published more than 100 papers in reputed journals and has been serving as an editorial board member of Korean Optometry Society.

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