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Gold Nanocomposite Contact Lenses for Ocular Health Management

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Color vision deficiency (CVD) or color blindness is an inherited genetic ocular disorder affecting millions of people around the globe. CVD is a common ocular disorder affecting, for example, an estimated 8% of males and 0.5% of women of Northern European descent. It limits distinguishing between specific colors depending on the CVD type and severity of the disorder. CVD patients may experience problems in work and everyday life when matching or discriminating between fine colors. Since there is no cure for color blindness so, the sufferers use wearables to enhance the color perception. The most commonly used wearables include tinted glasses, which act as optical filters and filter out the optical bands (540-580 nm) for the red-green CVD patients. In contract there are a few studies, which have presented the fabrication of tinted contact lenses for color blindness, and several issues related to their mechanical properties and toxicity were reported. In this study, gold nanoparticles were integrated into the soft hydrogel material based contact lenses, thus forming nanocomposite contact lenses targeted for red-green CVD application. The integration of nanomaterials into hydrogels is a prominent research challenge for a myriad of healthcare applications, such as bio-sensing, cancer therapy, and bone tissue engineering. In particular, practical contact lenses, functionalized with metallic nanoparticles are of interest for therapeutics and targeted therapy. Several types of nanoparticles were synthesized, characterized and incorporated within the pHEMA hydrogel material based contact lenses, and their resulting optical, mechanical, hydration and material properties were assessed. The optical transmission properties of the developed nanocomposite lenses were found to be analogous to those of the commercial CVD glasses, and their water content and wettability properties were better in comparison to some of the commercially available contact lenses used for cosmetic/vision correction purposes. Hence, this work demonstrates the potential usage of gold nanocomposite contact lenses in ocular health management and, more generally, color filtering applications.

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United Arab Emirates

References

A.E. Salih, M. Elsherif, F. Alam, A.K. Yetisen, H. Butt*, Gold Nanocomposite Contact Lenses for Color Blindness Management, ACS Nano, 10.1021/acsnano.0c09657 (2021) IF: 14.59

Time Block Preference

Time Block A (09:00-12:00 CET)

Participation

In person

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