

14th International Conference and Exhibition on

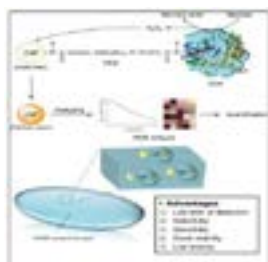
MATERIALS SCIENCE AND ENGINEERING

November 13-15, 2017 | Las Vegas, USA

Colorimetric contact lens type sensor consisting of cerium oxide nanoparticles and glucose oxidase for tear glucose detection

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A contact lens is ideal to monitor glucose levels in tear. We designed a contact lens-based biosensor comprised of glucose oxidase (GOX) and cerium oxide nanoparticle (CNP) to detect glucose levels in tear. GOX catalyzes the oxidation of glucose to hydrogen peroxide (H_2O_2) and gluconolactone. Then, CNP catalyzes the reduction of H_2O_2 . At this moment, Ce^{3+} being colorless shift to Ce^{4+} state that is shown yellow color. Glucose levels can be determined by analyzing the change of color. B value of RGB color is used to determine glucose levels, being shown the correlation with glucose concentration. To confirm the synthesized CNP structure, we perform the XPS, XRD, HR-TEM. GOX is immobilized on a modified-CNP using PEG spacer; it is CNP-PEG-GOX. The formation of CNP-PEG-GOX is determined via quantitative analysis of GOX. The contact lens sensor maintains its mechanical properties compared with HEMA contact lens. and has correlation with glucose levels in buffer and artificial tear.



Biography

Sijin Park graduated from Hanyang University, Department of Bioengineering at the age of 24, and progressed to master's course. She is mainly working on diabetes. In particular, she studies the development of glucose sensors for the management of blood glucose in diabetic patients. She has identified the disadvantages of the Fingerprick test, which is currently the most commonly used method, and invented a breakthrough method to overcome the drawbacks. Instead of measuring blood in the fingertips, she has developed a method for sensing blood glucose non-invasively through glucose concentration in the tear.

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