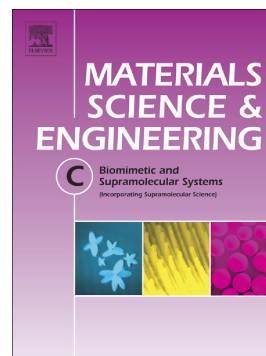


Accepted Manuscript

Polymerizable-group capped ZnS nanoparticle for high refractive index inorganic-organic hydrogel contact lens

Peili Zhao, Jinku Xu, Yongchun Zhang, Weiyue Zhu, Yuezhi Cui



PII: S0928-4931(17)33328-3

DOI: doi:[10.1016/j.msec.2018.04.086](https://doi.org/10.1016/j.msec.2018.04.086)

Reference: MSC 8543

To appear in: *Materials Science & Engineering C*

Received date: 18 August 2017

Revised date: 26 March 2018

Accepted date: 28 April 2018

Please cite this article as: Peili Zhao, Jinku Xu, Yongchun Zhang, Weiyue Zhu, Yuezhi Cui , Polymerizable-group capped ZnS nanoparticle for high refractive index inorganic-organic hydrogel contact lens. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Msc(2017), doi:[10.1016/j.msec.2018.04.086](https://doi.org/10.1016/j.msec.2018.04.086)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Polymerizable-Group Capped ZnS Nanoparticle for High Refractive Index Inorganic-Organic Hydrogel Contact Lens

Peili Zhao^a, Jinku Xu^{a,*}, Yongchun Zhang^a, Weiyue Zhu^a, Yuezhi Cui^a

^a Shandong Provincial Key Laboratory of Fine Chemical, School of Chemistry and Pharmaceutics Engineering, Qilu University of Technology (Shandong Academy of Sciences), Jinan, 250353, China.

*Correspondence to Xu J (Fax: +86 0531 8963 1208; Email: xujk@qlu.edu.cn; jkxu2003@126.com)

Abstract

Refractive index (RI) is an important parameter for contact lens biomaterials. In this paper, a novel polymerizable-group capped ZnS nanoparticle (NP) was synthesized by chemical link between hydroxyl group on the surface of ZnS (ME-capped) and isocyanate group of polymerizable molecule of 2-isocyanatoethyl methacrylate. Then the ZnS NP copolymerized with monomer of 2-hydroxyethyl methacrylate (HEMA) and N,N-dimethacrylamide (DMA) to prepare high refractive index hydrogel contact lens with high content of inorganic ZnS NP. Increasing polymerizable-group capped ZnS content in the hydrogels improved its RI value and mechanical properties, however decreased slightly its transmittance, equilibrium (ESR) and lysozyme deposition on the hydrogel surface. The ZnS-containing hydrogels possessed good cytocompatibility and *in vivo* biocompatibility in rabbit eyes, demonstrating a potential application as high RI ocular refractive correction biomaterial.

Keywords: Nanocomposite; Hydrogel; Refractive index; Contact lens

1. Introduction

Vision correction using a contact lens has become a widely used way for many people suffering from vision errors due to myopia, hyperopia, presbyopia, and astigmatism all over the world. Ideal contact lens material should be biocompatible, transparent, oxygen permeability, good mechanical strength, and high refractive index (RI)^[1]. Nowadays, it is still a huge technology challenge to fulfill all these requirements. To suit the application as contact lens, hydrogels either pHEMA-based or silicone-based ones have gained increasing attention, in which large quantities of water make them similar to soft tissues possessing high permeability to water-soluble metabolites including glucose, oxygen, and so forth^[2,3]. However, high water content hydrogels have commonly low refractive index and mechanical weakness, which make the lens has to be cut thicker to meet refractive requirement

Download English Version:

<https://daneshyari.com/en/article/7866144>

Download Persian Version:

<https://daneshyari.com/article/7866144>

[Daneshyari.com](https://daneshyari.com)