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(54) **METHOD OF PRODUCING INTRAOCULAR LENSES IN VIVO**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

4,542,542 A		9/1985	Wright	
4,787,904 A		11/1988	Severin et al.	
5,147,394 A		9/1992	Siepser et al.	
5,224,957 A		7/1993	Gasser et al.	
5,665,840 A		9/1997	Phlmann et al.	
5,871,675 A	*	2/1999	Muller et al.	264/1.38
5,945,498 A		8/1999	Hopkin et al.	
6,015,842 A		1/2000	LeBoeuf et al.	
6,589,550 B1	*	7/2003	Hodd et al.	424/429
6,767,934 B1	*	7/2004	Hodd et al.	522/64

FOREIGN PATENT DOCUMENTS

EP	0414219	2/1993
GB	2090264	12/1981
WO	9302639	2/1993
WO	WO9624074	8/1996
WO	9624074	8/1996

OTHER PUBLICATIONS

Graham et al., Nanogels and Microgels: The new polymeric materials playground, *Pure & Appl. Chem.*, vol. 70, No. 6, pp. 1271–1275, 1998.

Fisher, The Elastic Constants of the Human Lens,*J. Physiol.* (1971), 212, pp. 147–180.

van Alphen et al., Elasticity of Tissues Involved In Accommodation, *Vision Res.* vol. 31, No. 7/8, pp. 1417–1438, 1991.

* cited by examiner

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(57) **ABSTRACT**

Methods of producing an intraocular lens in vivo comprise preparing a composition of discrete water soluble macromolecular particles, mixing the composition with a water soluble photoinitiator and forming an opthalmically acceptable aqueous solution having a refractive index of at least 1.39, injecting the resulting aqueous solution into the capsular bag of an eye, and initiating crosslinking between the macromolecular particles by irradiation of a wavelength in the range of about 380 to 700 nm to create a lens in the capsular bag.

22 Claims, No Drawings