

Biomaterial synthesis for Intraocular/contact lenses

Background

The eye is a complex organ, eye-health issues such as glaucoma and myopia require new and better treatments. New biomaterials for this purpose are always under investigation. These biomaterials are the cornerstone of the intraocular and contact lens industries. Material scientists engineer these polymers to manage eye-health issues; scientifically speaking this is oxygen-permeability, low-modulus amongst other tailored physical and chemical properties..

Industrial demands

Current demands of biomaterials are as a drug delivery mechanisms, or to reduce the progression of high myopia. This requires further ingenuity of material design in the choice of polymers and reaction pathways to produce the biomaterial. Higher refractive index materials are an exciting prospect for producing thinner, higher power lenses that must also be user-friendly and cost-effective.

New method

Biomaterials research at MNMT-Dublin is concerned with both novel monomer combinations, and polymerization techniques to form new ophthalmic materials. We are developing biomaterials with high-optical properties; high transparency to visible light, high R.I, high water content etc. Once the material is identified we aim to verify the biocompatibility, physical and chemical properties.

Progress and results

We are developing a range of materials with selectable R.I steps, whilst other properties remain consistent (such as water content). This includes biomaterials with high refractive indices. These materials can be synthesised as large films, or moulded in metal moulds. The materials are investigated thoroughly using a suite of characterization techniques. Moreover, we are conscious of the necessary properties required for end-users and ease of manufacturing.

