

UNIT-V

MATERIAL USED IN MEDICINE

5.1 MATERIALS FOR OPHTHALMOLOGY

**Contact lenses and intraocular lenses (IOLs)** are made from a variety of materials, each with unique properties that affect their performance, comfort, and biocompatibility.

1. Contact Lens Materials

A. Soft Contact Lenses

Made from hydrogel or silicone hydrogel materials.

◆ **Hydrogel Lenses**

- Material: Hydroxyethyl methacrylate (HEMA) and other hydrophilic polymers
- Properties: High water content, soft, comfortable, but limited oxygen permeability
- Example: Acuvue 2 (Johnson & Johnson)

◆ **Silicone Hydrogel Lenses** (More modern)

- Material: Silicone + hydrogel
- Properties: Higher oxygen permeability than traditional hydrogels, better for long-term wear
- Example: Air Optix (Alcon), Biofinity (CooperVision)

B. Rigid Gas Permeable (RGP) Lenses

Made from oxygen-permeable plastics.

- Material: Silicone acrylates, fluoro-silicone acrylates
- Properties: Smaller than soft lenses, more durable, provide sharper vision
- Example: Boston XO (Bausch + Lomb)

C. Hybrid Lenses

- **Center:** RGP material
- **Outer skirt:** Soft silicone hydrogel
- Example: SynergEyes lenses A

D. Scleral Lenses

- Large-diameter lenses covering the sclera, used for keratoconus or severe dry eye

- Material: High-Dk (oxygen-permeable) RGP material

## 2. Intraocular Lens (IOL) Materials

IOLs are implanted in the eye during cataract surgery or refractive lens exchange.

### A. Polymethyl Methacrylate (PMMA) IOLs

- **First-generation lenses**, rigid, non-foldable
- **Used in early cataract surgery**, rarely used today

### B. Foldable IOLs (Modern)

These are more commonly used due to smaller incision requirements.

#### ◆ Silicone IOLs

- Flexible, hydrophobic
- Good for small incisions but may have **higher posterior capsular opacification (PCO)** risk

#### ◆ Hydrophobic Acrylic IOLs (Most Common Today)

- **Low water content**, less prone to PCO
- Example: AcrySof (Alcon)

#### ◆ Hydrophilic Acrylic IOLs

- More flexible, easier to implant
- May have a **higher PCO rate** than hydrophobic acrylics

#### ◆ Collamer IOLs (Used in Phakic IOLs like EVO ICL)

- A collagen-based material
- **Used for high refractive error correction**

### C. Specialized IOLs

1. **Aspheric IOLs** – Reduce spherical aberrations, improving contrast sensitivity.
2. **Multifocal IOLs** – Provide near and distance vision without glasses.
3. **Toric IOLs** – Correct astigmatism.
4. **Extended Depth of Focus (EDOF) IOLs** – Provide a continuous range of vision.