WE CLAIM:

1. A photo-responsive colored shape changing polymer composition comprising:

   (a) a photoinitiator that absorbs light in the wavelength range of 400 nm to 700 nm;

   (b) a cross-linked polymer matrix comprising A) monomers selected from 1) acrylate 2) methacrylate monomers and species selected from B) macromers synthesized from 1) acrylate 2) methacrylate monomers and C) crosslinker

   (c) a polymerizable composition comprising A) monomers selected from 1) acylate 2) methacrylate monomers and species selected from B) macromers synthesized from 1) acrylate 2) methacrylate monomers and C) crosslinker

   wherein, exposing the photo-responsive colored shape changing polymer composition to a photobleaching dose of light, in the wavelength range of 400 nm to 700 nm, photobleaches the photo-responsive colored shape changing polymer composition such that its maximum absorbance in the visible wavelength region is decreased by at least 50% from its value prior to exposure to the photobleaching dose of light.

2. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein the photoinitiator is selected from the group consisting of thioxanthone fluorenones, anthraquinone, xanthenic dyes and derivatives, acridines and its derivatives, pyrromethenes and derivatives, Polymethines, squarylium and its derivatives, julolidines and derivatives, and combinations thereof.

3. The photo-responsive colored shape changing polymer composition as claimed in claim 2, wherein the photoinitiator comprises 2 ethyl hexyl ester of Eosin-Y.

4. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein the cross-linked polymer matrix (b) comprises a mono unsaturated monomer and a cross-linker.

5. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein the cross-linked polymer matrix (b) comprises a mono unsaturated monomer and a macromer.

6. The cross-linked polymer matrix (b) as claimed in claim 4, wherein the mono unsaturated monomer is selected from 2 ethyl hexyl acrylate, butyl acrylate, butyl methacrylate, ethyl acrylate, ethyl methacrylate, 2ethyl hexyl methacrylate, isobutyl acrylate, t butyl acrylate, octyl acrylate, and octyl methacrylate.

7. The cross-linked polymer matrix (b) as claimed in claim 4, wherein the cross-linker is selected from ethylene glycol dimethacrylate, hexane diol diacrylate, ED 20 acrylate, trimethylol propane triacrylate, dipentaerythritol hexaacrylate, glycerol triacrylate.

8. The cross-linked polymer matrix (b) as claimed in claim 5, wherein the mono unsaturated monomer is selected from 2 ethyl hexyl acrylate, butyl acrylate, butyl methacrylate, ethyl acrylate, ethyl methacrylate, 2ethyl hexyl methacrylate, isobutyl acrylate, t butyl acrylate, octyl acrylate, and octyl methacrylate.

9. The cross-linked polymer matrix (b) as claimed in claim 5, wherein the macromer is obtained by the polymerization of monomer selected from alkylacrylate, alkylmethacrylate, hydroxyalkyl acrylate, hydroxyalkyl methacrylate, acryloyl ester alkyl acrylate, acryloyl ester alkyl methacrylate, wherein the alkyl functionality comprises a linear or a branched saturated hydrocarbon comprising 2 to 12 carbons.

10. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein the cross-linked polymer matrix has a glass transition temperature in the range from– 70^0 C to 10^0 C.

11. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein the polymerizable composition comprises a monomer selected from a) acrylate b) methacrylate monomer.

12. The photo-responsive colored shape changing polymer composition as claimed in claim 11, wherein the polymerizable composition comprises a monomer selected from 2 ethyl hexyl acrylate, decyl acrylate, or lauryl acrylate.

13. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein the polymerizable composition comprises a cross-linker.

14. The photo-responsive colored shape changing polymer composition as claimed in claim 13, wherein the polymerizable composition contains a cross-linker selected from ethylene glycol dimethacrylate, hexane diol diacrylate, ED 20 acrylate, trimethylol propane triacrylate, dipentaerythritol hexaacrylate, and glycerol triacrylate.

15. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein the polymerizable composition comprises a macromer.

16. The photo-responsive colored shape changing polymer composition as claimed in claim 15, comprises a macromer selected from the macromer of alkylacrylate, macromer of alkylmethacrylate, macromer of hydroxyalkyl acrylate, macromer of hydroxyalkyl methacrylate, macromer of acryloyl ester alkyl acrylate, macromer of acryloyl ester alkyl methacrylate, in which the alkyl functionality comprises a linear or branched saturated hydrocarbon comprising 2 to 12 carbons.

17. The photo-responsive colored shape changing polymer composition as claimed in claim 1, comprises a hydrogen donor selected from the group consisting of N phenyl glycine, benzyltrimethylstannanes, thiols, arylsulfinates, sulfur compounds, 1,3-diketone enolates, phosphines, carboxylates, borates, organotins, and amino acids (in the presence of phenoxazines), hydroxyl acrylates, hydroxyl methacrylates, and ascorbic acid.

18. The photo-responsive colored shape changing polymer composition as claimed in claim 1, comprising an electron donour selected from the group consisting of aliphatic or aromatic primary, secondary, tertiary amines, diphenyliodonium chloride, N phenyl glycine (NPGs), benzyltrimethylstannanes, thiols, arylsulfinates, sulfur compounds , 1,3-diketone enolates, phosphines, carboxylates, borates, organotins, and amino acids (in the presence of phenoxazines).

19. The photo-responsive colored shape changing polymer composition as claimed in claim 18, wherein the electron donor comprises dimethyl aminoethyl methacrylate.

20. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein exposing the composition to a shape changing dose of light, in the wavelength range of 400 nm to 700 nm, further changes the shape of the photoresponsive colored shape changing polymer composition by inducing the photoinitiator to cause photopolymerization of the polymerizable composition.

21. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein by exposing to a lock-in dose of light, in the wavelength range of 400 nm to 700 nm, the refractive properties of the photo-responsive colored shape changing polymer composition are locked in.

22. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein the lock-in dose of light lies in the range from 100 milli-joules/cm^2 to 50 Joules/cm^2 .

23. The photo-responsive colored shape changing polymer composition as claimed in claim 1, wherein the photo- bleaching dose of light lies in the range 100 milli-joules s/cm^2 to 50 Joules/cm^2 .

24. The photo-responsive colored shape changing polymer composition as claimed in claim 1, fabricated into a colored intraocular lens. wherein the exposure of the coloured intraocular lens to light in the wavelength range from 400nm to 700nm causes change in spherical power of the colored intraocular lens in the range of t 0.1 to 50 diopters in air.

25. The photo-responsive colored shape changing polymer composition as claimed in claim 1, fabricated into a colored intraocular lens, wherein the exposure of the colored intraocular lens to

light in the wavelength range from 400 nm to 700 nm causes change in cylindrical power of the colored intraocular lens in the range of 0.1 to 50 diopters in air.

26. The photo-responsive colored shape changing polymer composition as claimed in claim 1, fabricated into a colored intraocular lens, wherein on exposure to the light in the range of 400nm to 700nm, the shape changes in the photo-responsive colored shape changing polymer composition result in changes in rms value of higher order aberrations in the range from 0.001 microns to 25 microns in air.

27. A colored intraocular lens comprising;

a. photoinitiator that absorbs light, in the wavelength range of 400 nm to 700 nm,

b. a cross-linked polymer matrix comprising A) monomers selected from 1) acrylate 2) methacrylate monomers; and species selected from B) macromers synthesized from a) acrylate 2) methacrylate monomers and C) crosslinker

c. a polymerizable composition; comprising A) monomers selected from 1) acylate 2) methacrylate monomers; and species selected from B) macromers synthesized from 1) acrylate 2) methacrylate monomers and C) crosslinker

wherein, the colored intraocular lens can be photobleached by exposing the colored intraocular lens to a photobleaching dose of light in the wavelength range of 400 nm to 700 nm, such that the maximum absorbance of the colored intraocular lens in the visible wavelength region is decreased by at least 50% from its value prior to exposure to the photobleaching dose of light in the wavelength range of 400 nm to 700 nm.