Novel Nature Derived Green Materials for Laser Safety Glasses in Optoelectronics

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Since the discovery of laser by Maiman in 1960, it has been widely used in many fields, like, medicine, laboratory and military. While causing a great progress for the human society, it also brings a potential hazard for human eyes. Non Linear Optical property (NLO) is the change in colour of light beam, to change its shape in space and time. Therefore, a proper protective device is needed to stabilize them. Ideally an optical limiter exhibits linear transmittance at low powers, but it becomes slightly opaque at high incident intensities. This property is useful in protecting elements like human eye, and sensors that are sensitive to high intensity of light. Many materials such as photo refractive like -fullerenes,liquid crystals and carbon black particles are reported. However, they have long synthetic routes and complicated isolation procedures and stability issues which make them expensive and hazardous to use. Hence the search for an environment friendly, smart and natural material is imperative. On screening several natural extracts we found turmeric as the best NLO material. Later identified”Curcumin” a yellow pigment which is a natural component of a rhizome called turmeric, responsible for this activity. I now report the non linear property of naturally occurring Curcumin based metal complexes as optical limiters. They were synthesized using a simple single step precipitation method. They were charcterised by UV-Vis, IR,spectroscopy and screened for NLO properties using the open aperture Z Scan technique. Fabricated Poly Vinyl Alcohol (PVA) based thin membrane of 10μm thickness and characterized them; this thin film can be integrated directly to laser safety glass, camera lens and all optical lenses.This also has wider applications in optical communication etc.

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