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Systematic Study of LED Stimulated Recovery of Radiation Damage in Optical Materials

The radiation damage in optical materials mostly manifests itself as the loss of optical transmission. This loss can recover to some extent in the presence of natural light, and at a faster rate in the presence of stimulating light. On the other hand, the systematic study of the dynamics of the recovery as a function of the stimulating light parameters such as its wavelength, intensity and exposure duration and method has not been performed in detail so far.

We established an LED recovery station which provides pulsed and continuous light at various wavelengths at custom geometries. The study starts with the irradiation of soda lime glass samples at various gamma doses at a rate of 87.5 Gy/min. The optical transmittance of the samples are then measured in 200 nm - 1000 nm range for an extended period of time and significant findings on the dynamics of the recovery were obtained.

Here we report on the details of the irradiation and recovery setups, and the results of recovery from radiation damage under different light exposure mechanisms.

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