

Large nonlinear absorption under weak continuous incoherent light

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We show that hydroxyl steroidal matrices embedding properly designed aromatic molecules as acceptors and transition-metal complexes as donors exhibit high RSA on exposure to weak incoherent light at room temperature and in air. Accumulation by photosensitization of long-lived room-temperature triplet excitons in acceptors with a large triplet–triplet absorption coefficient allows a nonlinear increase in absorbance also under low-power irradiation conditions. As a consequence, continuous exposure to weak light significantly decreases the transmittance of thin films fabricated with these compounds. These optical limiting properties may be used to protect eyes and light sensors from exposure to intense radiation generated by incoherent sources and for other light-absorption applications that have not been realized with conventional RSA materials.