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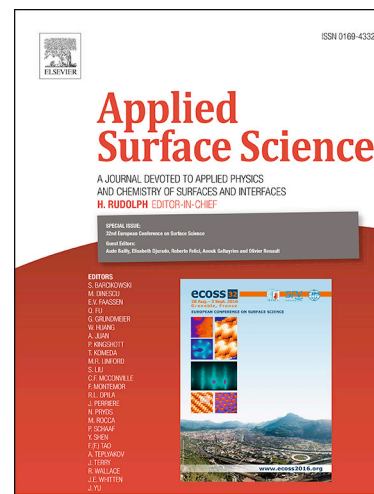
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Operation by optoelectronic features of cadmium sulfide nanocrystallites embedded into the photopolymer polyvinyl alcohol matrices

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Abstract.

Laser operation by optical third harmonic generation at Er:Yb glass laser fundamental wavelength 1540 nm for the cadmium sulphide (CdS) nanocrystallites (NC) with average sizes 13 nm, 20 nm, 50 nm embedded into the poly(vinyl alcohol) (PVA) photopolymer matrices was discovered. The 300 mJ intensity modulated continuous wave (cw) Nd:YAG 1060 nm laser was used for photoinduced changes. The content of CdS NC was chosen to be 3 %, 6 %, 9 %, 12 %. The CdS NC have been synthesized using electrolytic procedure and their structural and morphological features were monitored by X-ray diffraction and transmission electron microscopy (TEM). The dependences of the THG versus the cw laser light power density at 1060 nm was studied and has shown an existence of the maxima which are strongly dependent on the NC sizes. Generally with decreasing NC sizes the laser stimulated THG was increased. The relaxation of the photoinduced changes was explored. The effect may be used for laser operation by coherent harmonic generation in the CdS/polymer nanocomposites.

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Keywords: Semiconducting nanocrystallites, Nanocomposites, Nonlinear optics, nanocrystalline interfaces, laser induced treatment, nano-interfaces.

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