

**6th INTERNATIONAL CONFERENCE ON
MATERIALS SCIENCE AND
CONDENSED MATTER PHYSICS**



SEPTEMBER 11-14, 2012

ABSTRACTS

Chisinau 2012

ANALYTICAL CHARACTERIZATION OF PHOTODARKENING KINETICS IN AMORPHOUS CHALCOGENIDE FILMS

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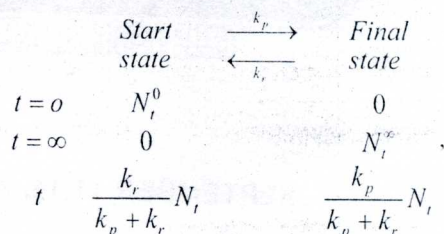
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The kinetics peculiarities of photodarkening in thin amorphous chalcogenide films of different thicknesses (from 0.54 to 4.07 μm), pre-history (virgin and annealed) and chemical composition ($\text{As}_{40}\text{Se}_{60}$, $\text{As}_{50}\text{Se}_{50}$ and $\text{As}_{60}\text{Se}_{40}$) were established in terms of photon-assisted site switching facilitating percolative growth of atomic clusters at ground state [1].

Within this formalism, the final photodarkened sites (independently on their origin), having higher energy, are supposed to be formed from original (start) sites, giving a dynamic intersite balance owing to straightforward (production) and backward (relaxation) reactions. So the overall set of photoinduced defect production-relaxation processes along with initial conditions can be conveniently presented via a scheme:



where N_t^0 is initial concentration of atomic sites available for relaxation; k_p and k_r are probabilities of precursor trapping and detrapping in final state, respectively.

In the framework of the above scheme, it was established the photodarkening in amorphous arsenoselenide films is non-dispersive in nature, its kinetics description on thickness, thermal pre-history and chemical composition being governed by penetration depth of pumping light beam (value the inverse of the absorption coefficient). The greater penetration depth of pumping light, the smaller non-dispersivity in the resulting photodarkening kinetics.

[1] A. Ganjoo, H. Jain H. *Phys. Rev.* v. **B74** (2006) p. 024201-1-6.