

Structural modification of chalcogenide glasses by gamma-irradiation studied with DBAL technique

Kavetskyy T., Tsmots V., Šauša O., Stepanov A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The original experimental results on the study of structural modification of chalcogenide glasses by ^{60}Co γ -irradiation with energy of 1.25 MeV and dose of 2.41 MGy for As_2S_3 , $\text{Ge}_{15.8}\text{As}_{21}\text{S}_{63.2}$, $\text{Ge}_{9.5}\text{As}_{28.6}\text{S}_{61.9}$ and $\text{Ge}_{23.5}\text{As}_{11.8}\text{S}_{64.7}$ alloys using Doppler broadening of annihilation line (DBAL) technique are reported. The γ -irradiation-induced effect is analyzed in terms of Doppler S and W annihilation parameters. In particular, the observed different slope of S - W plots for glassy (g-) As_2S_3 and g- $\text{Ge}_{15.8}\text{As}_{21}\text{S}_{63.2}$ studied in the unirradiated and γ -irradiated states indicates that the defect structure of these alloys in the radiation-modified state is different, obviously, as a result of various mechanisms of radiation-induced defect formation. © 2012 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

<http://dx.doi.org/10.1002/pssc.201200252>

Keywords

Chalcogenide glasses, Defects, Doppler broadening annihilation line, Gamma-irradiation