# MAGNETO-OPTICAL PROPERTIES OF OXIDE GLASSES CONTAINING RE IONS ($Pr^{3+}$, $Nd^{3+}$, $Dy^{3+}$)

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9.7 cm

Oxide glasses containing rare earth (RE) ions can be applied to magneto-optical devices, due to the high value of the Faraday rotation (FR) in a combination with optical transmittance. Here the results of the study of optical absorption, FR, magnetization (M) and their computer processing for $Pr^{3+}$, $Nd^{3+}$ and $Dy^{3+}$ ions in $Al_2O_3$–$B_2O_3$–$SiO_2$, $SiO_2$–$P_2O_5$–$GeO_2$ and $LiB_3O_5$ glass matrices are presented. The spectral range of the optical absorption and FR measurements was 220–2200 nm, and the temperature interval was 80–300 K. The magnetic field at the FR measurements was $\pm 5$ kOe. Magnetic measurements were made with SQUID magnetometer in the magnetic field up to 50 kOe in the temperature interval 5–300 K. Analysis of the temperature dependencies of the intensity, width and position of the absorption lines in the near IR has enabled us to ascertain the difference of size, symmetry and dispersion of distortions of the nearest environment of the RE ions in the glasses investigated. Temperature dependencies of FR and M testify to an antiferromagnetic ordering in the glasses at low temperatures. A formation of antiferromagnetic clusters of RE ions interacting through the oxygen ions is discussed as a possible mechanism of the FR and M temperature behavior.

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