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IR AND RAMAN STUDIES OF SOME MOLYBDENUM-LEAD-PHOSPHATE GLASSES

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The structure of $xMoO_3 \cdot (1-x)[2P_2O_5 \cdot PbO]$ glass system with $0 \leq x \leq 0.5$ was investigated by IR and Raman spectroscopies.

FT-IR spectra of the $xMoO_3 \cdot (1-x)[2P_2O_5 \cdot PbO]$ glasses exhibit the characteristic bands for the $2P_2O_5 \cdot PbO$ glass matrix and of MoO_3 oxide. At low concentration of MoO_3 the bands characteristic for phosphate oxide dominate. The strong bands around 900-950 cm^{-1} were assigned to the P-O-H bending and to the harmonics of P-O-P bending vibrations, whereas the 1047 cm^{-1} band is due to the stretching vibration of the PO_4^{3-} group (DAYANAND et al., 1996). The strong band around 1240 cm^{-1} is attributed to the P=O stretching vibration. The weak band around 1150 cm^{-1} is assigned to the $P\text{-}O^{(-)}$ ionic stretching vibration, whereas the 500 cm^{-1} band is due to the harmonics of the P-O bending vibration. With the increase of the molybdenum oxide content the shape of the bands is changed, and a new band around 780 cm^{-1} occurs for high concentrations of MoO_3. Other characteristic bands of MoO_3 are not present because these are overlapped by the characteristic bands for the P_2O_5.

The characteristic bands of the $2P_2O_5 \cdot PbO$ matrix are also obtained from Raman spectra. Thus, the band at 696 cm^{-1} is attributed to the P-O-P stretching vibration (ILIESCU et al., 1994). The P-O stretching vibration arises at 1068 cm^{-1}, whereas the O-P-O stretching vibration appears at 1174 cm^{-1} (SCAGLIOTTI et al., 1987). The P=O stretching vibration is present at 1220 cm^{-1}

It can be seen from the spectra that the IR and Raman bands are influenced by the presence of MoO_3 oxide in the glass matrix. This fact suggests that from low concentrations of MoO_3, structural changes occur in the $2P_2O_5 \cdot PbO$ glass matrix due to molybdenum ions that play the role of network modifiers.

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