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Far infrared studies of $PrFe_3(BO_3)_4$[1] KIRILL BOLDYREV, MARINA POPOVA, Institute for spectroscopy Russian Academy of Sciences, TARAS STANISLAVCHUK, ANDREI SIRENKO, Department of Physics, New Jersey Institute of Technology, LEONARD BEZMATERNYKH, Kirenskiy Institute of Physics, Siberian Branch of RAS — We present results on polarized far infrared reflectance, transmittance and ellipsometry measurements of $PrFe_3(BO_3)_4$ single crystals in a wide temperature range (5 - 300K). Rare-earth iron borates $RFe_3(BO_3)_4$ undergo an antiferromagnetic phase transition at temperatures below 40 K and all of them demonstrate magnetoelectric and magnetoelastic effects. $PrFe_3(BO_3)_4$ orders antiferromagnetically at $T_N = 32$ K. Pronounced changes in the low-frequency phonon spectra of $PrFe_3(BO_3)_4$ are observed at T_N which points to a significant spin-lattice interaction. Below 90 K, a new feature at 48 cm^{-1} appears in the pi-polarized reflectance spectra. We attribute this feature to a Pr^{3+} crystal-field transition that becomes observable in reflectance due to interaction with a nearby phonon 60cm^{-1}.

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