

302. Title:Terahertz birefringence in zinc oxide

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Abstract:The birefringence of zinc oxide (ZnO) in the terahertz (THz) frequency range is measured using a parallel-polarization configuration THz timedomain spectrometer and compared with the result of an ab initio calculation. The measured birefringence of 0.180 at 1 THz shows good agreement with the calculated value of 0.170 from full phonon consideration, both of which are about 20 times larger than the birefringence in the visible range. It is found that the difference of the transverse optical and longitudinal optical (TO-LO) phonon splitting between the optical phonon branches (A_1 and E_1) predominantly contributes to the huge birefringence of ZnO in the THz frequency region.