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Opacification of dielectrics oxides investigated by infrared emittance spectroscopy MYRIAM ECKES, DOMINGOS DE SOUSA MENESES, MOHAMMED MALKI, PATRICK ECHEGUT, CEMHTI-CNRS, Universite d Orleans, Orleans, France — With increasing temperature, some compounds that are transparent in the near infrared range at room temperature become progressively opaque towards the liquid phase. Such a behavior deeply impacts their thermal radiative properties which knowledge is of main importance in crystal growth processes for example. To understand this phenomena, infrared emittance spectra were acquired from room temperature up to the liquid state on crystalline LaAlO_3 and LiAlO_2 . The samples are heated with a CO_2 laser that allows a direct measurement of emittance up to their melting point and in a wide spectral range, i.e. between 50 and 10000 cm^{-1} . In the transparency region, we observed an increase of emittance up to 1000 K for LaAlO_3 (more than 1000 K before the solid to liquid transition) and no significant increase of emittance for LiAlO_2 before the solid to liquid phase transition. The experimental data have been fitted with a dielectric function model including a Debye relaxation term. The absorption mechanism at the origin of the opacification is thermally activated and has a relaxation time compatible with a motion due to electrons. Electrical conductivity measurements of these compounds were also made up to 800K.

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