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Analysis of the Temperature Dependence of the Thermal Conductivity of Insulating Single Crystal Oxides FRANCISCO RIVADULLA, Dpto. Qumica-Fsica, Universidad de Santiago de Compostela, ERIC LANGENBERG, University of Cornell, ELIAS FERREIRO VILA, University of Geneva, VICTOR LEBORN, ADOLFO OTERO-FUMEGA, VICTOR PARDO, Universidad de Santiago de Compostela — The application of epitaxial thin-films to a broad range of phenomena which require a detailed knowledge of heat transport (thermoelectricity, heat-assisted spin-transfer effects, thermal insulation and heat dissipation in nanostructures, etc) is becoming increasingly important. For the particular case of oxides, strain engineering by epitaxial growth of thin films is a powerful technique when it comes to gaining access to novel phases, and thus engineering new or enhanced functional properties. A systematic variation of the film properties requires therefore the use of different substrates, which may differ substantially in their lattice parameters and orientation. Here we report the temperature dependence of the thermal conductivity of 27 different single crystal oxides, from 20 K to 350 K. These crystals have been selected among the most common substrates for growing epitaxial thin-film oxides, spanning over a range of lattice parameters from 3.7 to 12.5 $\mathring{A}$. Different contributions to the phonon relaxation time are discussed on the basis of the Debye model. This work provides a database for the selection of appropriate substrates for thin-film growth according to their desired thermal properties, for applications in which heat management is important.

Francisco Rivadulla
Dpto. Qumica-Fsica, Universidad de Santiago de Compostela

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