PADERBORN UNIVERSITY

Collaborative Research Center TRR 142

dortmund university

PhoQS

CeOPP
Center for Optoelectronics and Photonics Paderborn

PHOTONICS LECTURE

WEDNESDAY, 22 MAY 2024 | 16:00

PROF. DR. KLAUS-DIETER BECKER

LECTURE HALL A1

Optical Spectroscopy at High Temperatures: LN, LT & LNT

Lithium niobate, lithium tantalate, as well as their solid solutions have been studied by means of optical absorption spectroscopy at temperatures up to 1200°C. The spectra are dominated by the fundamental absorption edges which, for rising temperatures, are found to shift to lower energies and to show a far-from-linear isothermal composition dependence. The transition from the ferroelectric to the paraelectric phase is reflected by changes in the temperature dependence of band gaps indicating structure-related changes in electron-phonon coupling.

Oxidation and reduction represent an important class of solid-state reactions associated with changes in crystal stoichiometry and many crucial materials properties. Optical absorption induced by reduction-generated small electron polarons is used to derive information on the kinetics of the redox processes in LN and to gain insight into atomic diffusion of lithium vacancies as well as of lithium ions.