Abstract Submitted
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Erbium ions in congruent and stoichiometric lithium niobate. Searching for a clue[1] IAN VRABLE[2], VALENTIN GRACHEV, MARTIN MEYER, Montana State University, EDWARD KOKANYAN, Institute for Physical Researches, Ashtarak, Armenia, GALINA MALOVICHKO, Montana State University — Lithium Niobate (LN) doped with Er^{3+} ions is of great interest for both fundamental science and advanced applications: lasers with frequency conversion, elements of all-optical telecommunication network and quantum cryptography. According to the EXAFS and RBS data, trivalent ions substitute for Li^{+} and should create similar centers with charge compensation by lithium vacancies. The EPR studies confirmed this conclusion for Cr, Fe, Nd, and Yb Their most intense lines belong to axial centers with C_3 symmetry. Distant lithium vacancies cause a line broadening, but do not change the C_3 symmetry of observed spectra. Our EPR study of Er^{3+} in stoichiometric LN has unexpectedly shown that all observed Er^{3+} centers have C_1 symmetry. Therefore, models with cation vacancies cannot describe our experimental data for LN:Er, and we have to consider complexes which excludes the existence of axial centers: erbium substituted for lithium or incorporated in octahedral or tetrahedral structural vacancy plus interstitial oxygen ion as a charge compensator, erbium substituted for niobium and oxygen vacancy as compensator of excessive negative charges. Re-investigating congruent samples of LN:Er, we did not find undisputable evidences of the existence of axial Er^{3+} centers.

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