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Stable dielectric, elastic, and piezoelectric properties at high temperature of Yb^{3+}:CNGS crystals

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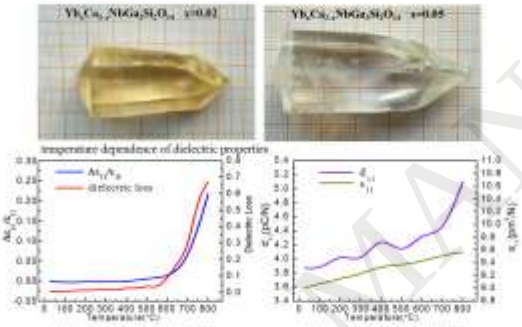
Graphical Abstract



Highlights

1.Single crystals Yb:CNGS with high quality have been successfully grown by the Czochralski method.
2.The dielectric, elastic and piezoelectric coefficients were measured and calculated according to the impedance method at room temperature and elevated temperature for the first time.
3.The doped crystals show good temperature stability at elevated temperature condition.

Abstract

In this study, Yb^{3+}:$Ca_3NbGa_3Si_2O_{14}$ (Yb^{3+}:CNGS) single crystals with different doping concentrations (2 and 5 at%) were grown **using** the Czochralski method. The dielectric, elastic, and piezoelectric coefficients **at room temperature and elevated temperature** were measured and calculated according to the impedance method for the first time, **which show excellent piezoelectricity** and exhibit favorable temperature stability from room temperature to 800 °C. **The**