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BIBLIOGRAPHY ON KTP ISOMORPHS

NILS C. FERNELIUS

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13. ABSTRACT *(Maximum 200 words)*

This report lists papers of isomorphs of $KTiOPO_4$ (KTP), i.e., papers on compounds of the form $MTiOXO_4$ where M=K,Cs,Rb,Tl and X=P,As. Separate special bibliographies are given for nonlinear optics (NLO) uses of KTP isomorphs, for KTA($KTiOAsO_4$), RTA ($RbTiOAs_4$), and CTA($CsTiOAsO_4$).

14. SUBJECT TERMS
KTP isomorphs, rubidium titanyl phosphate, $RbTiOPO_4$, RTP, potassium titanyl arsenate, $KTiOAsO_4$, KTA, rubidium titanyl arsenate, $RbTiOAsO_4$, RTA, Cesium titanyl arsenate, $CsTiOAsO_4$, CTA

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BIBLIOGRAPHY ON KTP ISOMORPHS

1. INTRODUCTION

The Nd:YAG laser is currently the most popular solid state laser on the market. Its most intense lasing wavelength is at 1.064 μm. To obtain a visible output, a nonlinear optical (NLO) crystal is used to yield a 532 nm line by second harmonic generation (SHG). At the moment, potassium titynal phosphate, $KTiOPO_4$ (KTP), is used to obtain the SHG in most new systems. Since KTP has been so successful a NLO crystal, it was thought that some of its relatives or isomorphs might be good candidates for new NLO crystals having better properties for some niche applications.

The general chemical formula is $MTiOXO_4$ where M = K, Cs, Rb, Tl and X = P, As. Since we are interested in making optical parametric oscillators (OPOs) that have outputs in the 3-5 μm wavelength range (an atmospheric window), most of our efforts have been with X = As since PO_4 becomes opague around 4 μm.

The Materials Directorate of Wright Laboratory has issued a number of contracts on KTP isomorphs and the grey track problem of KTP. The contract titles and numbers are as follows: "Improved KTP Crystal Growth", F33615-91-C-5645; "Synthesis, Crystal Growth and Characterization of $CsTiOAsO_4$ for OPO Applications to 5 Microns", F33615-92-C-5947; "Improved Growth of KTP & KTA Crystals", F33615-93-C-5306; "Improved NLO Materials to 5 microns: Growth of CTA, RTA and Mixed Crystals", F33615-93-C-5380; "New Nonlinear Materials for Applications at 2-5 μm", F33615-94-C-5410, "Improved Materials for Electro-Optic & Nonlinear Optical Applications in the Mid-IR", F33615-95-C-5435; "$CsZrOAsO_4$ (CZA) and $K_{1-x}Rb_xTiOAsO_4$ (KRTA), New Nonlinear Materials for Laser Application in the 2-5 μm Region", F33615-95-C-5443.

2. NLO REFERENCES WITH KTP ISOMORPHS

References of nonlinear optics uses involving KTP isomorphs are listed in the following bibliography ordered alphabetically by first author. This includes uses such as second harmonic generation, optical parametric oscillators, Sellmeier equation determinations , sum and difference frequency generators, and modulators. As of 31 January 1997, NLO papers comprise 70 of the 194 total.

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