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Study on the mechanical properties of potassium sodium hydroxide borate hydrate (KSB) single crystals by using Vickers microhardness tester

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Abstract

The mechanical properties of solution grown potassium sodium hydroxide borate hydrate single crystal (KSB) have been obtained by using Vickers microhardness studies in the load range from 10 to 70 g. The variation of microhardness with load represents the load independent value of hardness (Indentation size effect). The mayer index number 'n' is calculated as 1.81 and it belongs to soft material category. Various mechanical parameters such as yield strength, elastic stiffness constant, fracture toughness, brittleness index, hardness contour and crack propagation of KSB single crystal are discussed in detail.

Keywords: Crystal growth, Indentation and hardness, Deformation and fracture, Elastic properties

1. Introduction

In the past few decades, inorganic nonlinear optical materials have a significant impact because they have potential practical applications in the field of optics and laser technology which includes frequency conversion, optical limiting, optical computing and optical storage devices [1]. Purely inorganic materials exhibit excellent mechanical, thermal properties and have a high degree of chemical inertness than the organic compounds. On the basis of this

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