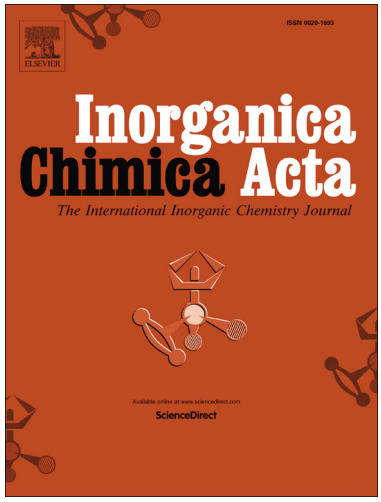

Research paper

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Synthesis and Characterization of Mixed Alkali Borophosphate with a New 1D Chain: $Li_3Cs_2BP_4O_{14}$

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Abstract

A new anhydrous mixed alkali metals borophosphate, $Li_3Cs_2BP_4O_{14}$, has been synthesized by the solid-state reaction. Single crystal X-ray diffraction analysis reveals that the title compound crystallized in a tetragonal geometry with space group of $P4_2/mbc$ (No. 135) and cell parameters of a = 10.3413(5) Å, b = 10.3413(5) Å, c = 12.042(2) Å. Its one-dimensional (1D) chain structure is constructed by fundamental building unit (FBU) of $[B(P_2O_7)_2]^{5-}$ which contains P–O–P connections with B:P = 1:4. Thermal analysis, UV-Vis-near-IR diffuse reflectance spectroscopy, IR spectroscopy and theoretical calculations have been well performed on this new borophosphate compound.

1. Introduction

Borates have long been the subject of research for exhibiting diversified structure types, and many potential properties such as excellent optical feature and high laser–damage tolerance [1-5]. Increasing attention has been noticed in the synthesis of metal phosphates