

Accepted Manuscript

Research paper

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Riadh Bourzami, Hakima Chenefa AitYoucef, Noudjoud Hamdouni, Miloud Sebais

PII: S0009-2614(18)30620-1
DOI: <https://doi.org/10.1016/j.cplett.2018.08.002>
Reference: CPLETT 35832

To appear in: *Chemical Physics Letters*

Received Date: 9 April 2018
Revised Date: 28 July 2018
Accepted Date: 1 August 2018

Please cite this article as: R. Bourzami, H. Chenefa AitYoucef, N. Hamdouni, M. Sebais, Synthesis, crystal structure, vibrational spectra and thermal properties of novel ionic organic-inorganic hybrid material, *Chemical Physics Letters* (2018), doi: <https://doi.org/10.1016/j.cplett.2018.08.002>

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Synthesis, crystal structure, vibrational spectra and thermal properties of novel ionic organic-inorganic hybrid material

Riadh Bourzami ^a, Hakima Chenefa AitYoucef ^{b,*}, Noudjoud Hamdouni ^c, Miloud Sebais ^c

^aEmerged material unit, Setif-1 university, Setif 19000, Algeria

^bDépartement Enseignement de Base en Technologie, Faculté de Technologie, Université Ferhat Abbas, Sétif-1, Algeria

^cLaboratoire de Cristallographie, Département de Physique, Faculté des Sciences Exactes, Université des Frères Mentouri Constantine-1, 25000, Algeria

*Corresponding author. E-mail address: hakimaaitoucef@yahoo.fr
aitoucefhakima@univ-setif.dz (Hakima Chenefa AitYoucef).

Abstract:

A novel and simple approach to the synthesis of a new organic-inorganic $4C_3H_5N_3O_3^{2+} \cdot 2C_3H_4N_3O_3^+ \cdot 5HPO_4^{2-} \cdot 4H_2O$ resulted from the reaction of melamine and phosphoric acid in methanol. It was identified by means of the single crystal X-ray diffraction and characterized using different physicochemical studies to gain deeper insight in its structure. The determination of the crystal structure showed that the compound crystallizes in monoclinic system with the space group $P2_1$, lattice parameters $a=11.3061\text{\AA}$, $b=20.9911\text{\AA}$, $c=12.2711\text{\AA}$. The UV-Vis shows a good transmittance in the visible range, with an absorption threshold at 255 nm. The thermal behavior divulges a good thermal stability up to 230°C.

Key words: Organic-inorganic hybrid, FT-IR spectroscopy, Raman spectroscopy, crystal structure, X-ray crystallography.

1. Introduction

Organic-inorganic hybrid materials have been investigated for their interesting and important properties. Their expectations go further than mechanical strength, such as thermal and chemical stability. Hence these hybrids represent new generation of materials possessing promising applications. They can be applied in many branches of

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