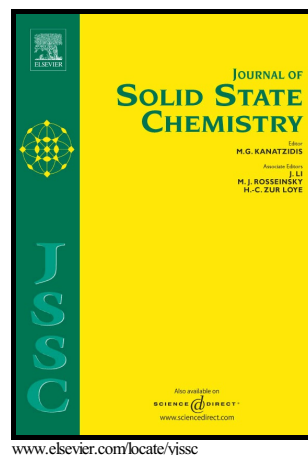


# Author's Accepted Manuscript

A new set of  $\text{K}_3\text{Fe}_3(\text{PO}_4)_4.y\text{H}_2\text{O}$  ( $0 \leq y \leq 1$ )  
layered phases obtained by topotactic reactions

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**A new set of  $\text{K}_3\text{Fe}_3(\text{PO}_4)_4 \cdot y\text{H}_2\text{O}$  ( $0 \leq y \leq 1$ ) layered phases****obtained by topotactic reactions.**Khiem Trad <sup>a,b</sup>, Alain Wattiaux <sup>a</sup>, Mongi Ben Amara <sup>b</sup>, Claude Delmas <sup>a</sup> and Dany Carlier <sup>a\*</sup><sup>a</sup> CNRS, Univ. Bordeaux, Bordeaux INP, ICMCB UMR 5026, F-33600 Pessac, France<sup>b</sup> UR : Matériaux Inorganiques, Faculté des Sciences, Université de Monastir, avenue de l'environnement, 5019, Monastir, Tunisia**Abstract**

$\text{K}_3\text{Fe}_3(\text{PO}_4)_4 \cdot \text{H}_2\text{O}$  powder was synthesized by  $\text{Na}^+/\text{K}^+$  exchange reaction from  $\text{Na}_3\text{Fe}_3(\text{PO}_4)_4$  in aqueous medium. The replacement of the sodium cations by the potassium larger ones and water molecules causes a structural distortion leading to P2/n monoclinic  $\text{K}_3\text{Fe}_3(\text{PO}_4)_4 \cdot \text{H}_2\text{O}$ . This new layered phase was characterized by XRD, Mössbauer spectroscopy and magnetic measurements. The study of its thermal stability reveals that other new layered  $\text{K}_3\text{Fe}_3(\text{PO}_4)_4 \cdot y\text{H}_2\text{O}$  with ( $0 \leq y \leq 1$ ) phases can be stabilized up to 600°C and finally at higher temperature a new  $\text{K}_3\text{Fe}_3(\text{PO}_4)_4$  polymorph with a different structural type is irreversibly formed.

**Graphical abstract**New layered  $\text{K}_3\text{Fe}_3(\text{PO}_4)_4 \cdot y\text{H}_2\text{O}$  phases prepared by ion-exchange from  $\text{Na}_3\text{Fe}_3(\text{PO}_4)_4$

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