MS14-1-1 Crystal structure and catalytic performance of a new vanadophosphate material #MS14-1-1

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Abstract
A new vanadophosphate material, Li(C4N2H12)2[(HPO4)(VO)3(PO4)3], has been hydrothermally synthesized and structurally characterized by crystal X-ray diffraction (Fig1). The hybrid compound crystallizes in the orthorhombic system (SG: Pna21) with the following parameters (Å): a=14.6207, b=8.709, c=17.6208. its crystal packing, consisting of layers parallel to bc plane, is made of alternating rings of VO5, VO6 and PO4 polyhedral sharing vertices via oxygen atoms. The Li-ions are located in the eight membered rings, exactly at the opening window of the layers, while the protonated organic molecules reside between the interlayer space and interact with the inorganic moiety via hydrogen bonds in a three-dimensional arrangement. The thermal behaviour leads to the formation of vanadium pyrophosphate precursor. The sorpativity and catalytic activity of the hybrid material were tested both as a sorbent for methylene blue (MB) dye in aqueous solutions and as a catalyst for the oxidation and degradation of (MB) in presence of H2O2, and the results showed the efficiency of the compound on the removal of the organic dye (MB).