

Nanostructured VO_x/VO(PO₄)_n Using Solid-State Vanadium Containing Phosphazene Precursors: A Useful Potential Bi-Catalyst System

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Pyrolysis of molecular precursors containing vanadium organometallic and cyclic phosphazene affords mixtures of nanostructured vanadium oxides and pyrophosphates. The products from the molecular precursor [N₃P₃(OC₆H₅)₅OC₅H₄N·Cp₂VCl][PF₆], and of the mixtures Cp₂VCl₂/N₃P₃(OC₆H₄CHO)₆ and Cp₂VCl₂/[NP(O₂C₁₂H₈)₃] in several relationships 1:1, 1:3, 1:5 and 1:10, pyrolyzed under air and at 400 °C and 600 °C, give mixtures mainly V₂O₅ and VO(PO₃)₂. Varied morphologies depending on the molecular or mixture precursors and of the temperature used were observed. Nanowires with diameters of approximate 40 nm were observed for the 1:5 Cp₂VCl₂/[NP(O₂C₁₂H₈)₃] mixture pyrolyzed at 400 °C, while the same mixture pyrolyzed at 600 °C, affords xerogels of V₂O₅. The products were characterized by scanning electron microscopy (SEM), energy dispersive X-ray analysis (EDX), transmission electron microscopy (TEM), infra-red (IR) spectroscopy and X-ray diffraction (XRD). The preparation method constitutes a nove