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INTERCALATION OF Co-COMPLEX INTO THE LAYERED STRUCTURE OF VOPO4·2H2O FOR THE PREPARATION OF VANADYL PYROPHOSPHATE, (VO)2P2O7 CATALYST

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ABSTRACT
Layered vanadyl phosphate dihydrate, VOPO4·2H2O is one of the precursor to vanadyl pyrophosphate (VPO) catalyst which is the sole catalyst used industrially for the partial oxidation of *n*-butane to maleic anhydride. With a basal spacing of 0.74 nm, layered VOPO4·2H2O was used as the host and Co-complex (Co(acac)2) as a guest The obtained precursor, VOHPO4·0.5H2O was confirmed by XRD and were activated in a reaction flow of *n*-butane/air mixture (0.75% *n*-butane/air) to form vanadyl pyrophosphate catalyst ((VO)2P2O7) at 460oC for 18 h. Both catalysts were characterised by using several methods *i.e.* X-ray Diffraction (XRD), Braunner Emmer Teller (BET) surface area and Temperature Programmed Reduction (TPR), Redox titration and Scanning Electron Microscopy (SEM). Co-complex was succesfully intercalated into the layer and as proven by XRD with a presence of a new peak appeared at 2θ = 6.8º and another new peak was also observed at 2θ = 13.5 º. TPR studies of Co intercalated VPO shows a sharp peak come with larger area (compared to unintercalated catalyst) which correspond to the removal of oxygen species associated to V4+ phase. Another peak at lower temperature which corresponds to the oxygen species released from V5+ phase. An improved of *n*-butane conversion is expected due to the increment of the active oxygen species (O-) which responsible to the activation of *n*-butane. Higher amount of oxygen linked to V5+ also will contribute to the activity of the Co-intercalated catalyst.

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