

## The effect of Bi promoter on vanadium phosphate catalysts synthesized via sesquihydrate route.

### ABSTRACT

A series of 1%, 3% and 5% Bi-doped vanadyl pyrophosphate catalysts were prepared via sesquihydrate route (VPOs method). These catalysts were denoted as VPOs-Bi1%, VPOs-Bi3% and VPOs-Bi5%. Bulk and Bi-promoted vanadyl pyrophosphate catalysts prepared via sesquihydrate route exhibited a well-crystallized  $(VO)_2P_2O_7$  phase. Two  $V^{5+}$  phases, i.e.  $\beta$ -VOPO<sub>4</sub> and  $\alpha$ II-VOPO<sub>4</sub> were observed in all Bi-promoted VPO catalysts, which led to an increase in the specific surface area and average oxidation state of vanadium. Bi-promoted VPO catalysts showed six to nine times higher amounts of oxygen evolved than the bulk VPO catalyst in oxygen TPD and a significant shift in the reduction peaks to lower temperatures. Catalytic tests revealed that both activity and selectivity to maleic anhydride increased with the presence of bismuth promoter.

**Keyword:** Vanadyl pyrophosphate; Bismuth; Selective oxidation.