

## **Synthesis and Characterization of Ni-Doped Vanadium Phosphorus Oxide Catalysts**

### **Abstract**

The effect of Ni doping (1%, 2%, and 5%) on vanadium phosphate catalysts prepared via  $\text{VOPO}_4 \cdot 2\text{H}_2\text{O}$  was described and discussed. At low levels, the Ni dopant significantly enhanced the amount of the active lattice oxygen species  $\text{O}^-$  and lowered the reduction peak temperature corresponding to the reduction of  $\text{V}^{5+}$  and  $\text{V}^{4+}$  phases. A combination of powder X-ray diffraction, temperature-programmed reduction, and chemical analysis data shows that at higher levels, Ni doping induced the formation of the  $\text{V}^{5+}$  phase and suppressed the presence of the  $\text{V}^{4+}$  phase. Previous studies have indicated that a large amount of oxygen species associated with  $\text{V}^{5+}$  inhibit the n-butane conversion but promote the selectivity for maleic anhydride.

**Keyword:** vanadyl pyrophosphate, nickel, n-butane, oxidation, maleic anhydride