

Influence of milling media on the physicochemicals and catalytic properties of mechanochemical treated vanadium phosphate catalysts.

Abstract

VOHPO₄·0.5H₂O synthesized via the alcohol reduction of VOPO₄·2H₂O was mechanochemical treated for 30 min in three different media, i.e. cyclohexane, ethanol and air. XRD results revealed that their structure became less crystalline compared to the unmilled material. SEM showed that the particles for the milled materials become smaller and unique features were observed in the different type of media used. The reactivity of the oxygen species linked to V⁵⁺ and V⁴⁺ were also affected by the milling process. The selectivity to maleic anhydride from n-butane oxidation were observed to increase in line with the increase in the oxygen species associated with V⁵⁺ and the presence of isolated V⁵⁺ phase. A correlation was observed between the crystallite size of the pyrophosphate phase at (020) plane with the maleic anhydride selectivity.

Keyword: Mechanochemical; Vanadium phosphate; Maleic anhydride; N-butane oxidation.