MaMaSELF

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Quantitative Phase Analysis of Industrial Vanadyl Phosphate Catalyst

Vanadyl phosphate catalyst has been used industrially for the last few decades for selective oxidation of n-butane to maleic anhydride. However, owing to containing different phases within the catalyst system, the exact nature of the relation between the phases and catalytic properties are still under dispute. The main crystalline phase is supposed to be V4+ of (VO)2 P2 O7 (VPP) together with amorphous and crystalline minor phases of V5+ or V4+ oxidation state. The initial test samples were collected from different furnace position during activation stage followed by test conducted on bench scale unit under reaction condition. XRD has been conducted on Bragg-Brentano mode and quantitative phase analysis has been carried out on Reitveld refinement software. The refinement result reveals the presence of a phase (V4+, VO(PO3)2) which is commonly not cited in the literature due to a different preparation route unlike the industrial synthesis process. Furthermore, from the refinement result it is found that there is a positive correlation between the catalytic activity and the amount of crystalline VPP phase present in the bulk. In order to get a full picture of the activity in relation to bulk properties other characterisation techniques need to be employed together with detailed knowledge of the surface properties.

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