TRANSIENT PHENOMENA IN O-XYLENE OXIDATION IN A FLUIDIZED BED REACTOR

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The effect of stirring a vanadium-titanium-tellurium catalyst on the yield of the selective oxidation products for oxidation of o-xylene in fluidized bed reactors has been studied. It is shown that the stirring of catalyst pellets increases the yield of phthalic anhydride.

The oxidation of o-xylene to phthalic anhydride is usually performed in tubular reactors with a fixed catalyst bed, which are complicated and expensive. Therefore attempts to carry out the process in a fluidized catalyst bed are of a great interest. But as is known, the yield of phthalic anhydride in this case is significantly lower than in the fixed bed reactors. One of the reasons is the unfavorable hydrodynamic condition in a fluidized bed limiting the mass transfer between the dense catalyst phase and the gas in bubbles. Another reason for the decreased yield can be the stirring of the catalyst in the direction of the stream of the reaction mixture, which makes the catalyst unsteady, thus affecting the yield of phthalic anhydride.

We have studied the effect of catalyst stirring on the yield of phthalic anhydride in a fluidized bed reactor.
A vanadium-titanium-tellurium mixed oxide catalyst (V-Ti-Te-O) /1/ contained 7.5 wt% V$_2$O$_5$ with respect to TiO$_2$ (rutile) and 20 mol% TeO$_2$ with respect to V$_2$O$_5$. The initial reaction mixture was 1 vol. % o-xylene in air.

The oxidation of o-xylene was studied in a laboratory glass reactor (Fig. 1) supplied with a spiral made of nichrome wire to attain regular fluidization. Visual observations indicate the efficiency of applying the above spiral: the catalyst