### Oxidation of $C_5$ Hydrocarbons to Maleic Anhydride

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A study was made of vapor phase catalytic oxidation into maleic anhydride of pentene-2, and of mixtures of isopentenes over a vanadium-phosphorus catalyst. The yields from pentene-2 were higher than from the isopentenes.

Also investigated was the effect of oxidation conditions upon catalytic activity and selectivity. The optimum conditions for oxidation of pentenes to maleic anhydride are as follows: temperature, 470°–500°; space velocity of gaseous stream, approximately 4,000 $hr^{-1}$. For pentene-2 feed rate of 60 g/hr/L. cat, the yield of maleic anhydride approaches 82% by weight.

### Kinetics of Catalytic Oxidation of Furfural

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Equations describing kinetics of oxidation of furfural to maleic anhydride over a vanadium catalyst were derived from the kinetic data for the process. Kinetic reaction constants were determined for the formation and oxidation of maleic anhydride and for complete oxidation of furfural.

An experimental study was also carried out to determine the kinetics of complete oxidation of maleic anhydride at a comparable set of conditions.

### Production of Aldehydes and Ketones by a Method of Combined Oxidation and Dehydrogenation of Alcohols

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Demonstrated is the possibility for improved processes for production of aldehydes and ketones by simultaneous catalytic oxidation and dehydrogenation of alcohols. The process is carried out in presence of a silver catalyst deposited on a calcined aluminum oxide containing admixtures of alkali oxides or of alkali earth metal oxides.

### Production of Anthraquinon and of Phthalic and Maleic Anhydrides by Oxidation of an Anthracene-Phenanthrene Fraction

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A study was made of the process of oxidation of an anthracene-phenanthrene fraction to produce anthraquinone and phthalic and maleic anhydrides in higher yields than by oxidation of pure anthracene and phenanthrene.

The change in performance of the process may be due to the fact that the components of a mixed feed exert a combined effect on the oxidation process.

In the process of oxidation of an anthracene-phenanthrene fraction, carbazole is an objectionable impurity. Consequently, its concentration in the feed should be minimized.

### Catalytic Oxidation of 2,2′-Dibenzanthranyl by a Mixture of Ozone and Oxygen

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On the basis of the results from oxidation of 2,2′-dibenzanthranyl with a mixture of ozone and oxygen, the authors show that introduction of changeable-valence metal ions into the reaction zone makes possible a step-wise oxidation of aromatics without any ring-opening.

Decomposition of ozone within the surface layer is believed to represent the first stage of the reaction.

A study was also made of the effects of the following process variables:

(1) Catalyst concentration;

(2) Concentration of the substance to be oxidized;

(3) Concentration of ozone;

(4) Degree of acidity of the reacting mixture.