Contact Process

The contact process is an industrial chemical process used to produce sulfuric acid through a series of steps. Discover its definition, steps, applications, and importance in various industries.



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Introduction

The contact process is a vital industrial chemical process that plays a significant role in the production of sulfuric acid.



Definition

The contact process, or the sulfuric acid manufacturing process, is a method used to produce sulfuric acid by oxidizing sulfur dioxide with oxygen in the presence of a catalyst, typically vanadium pentoxide.

Steps of Contact Process

Step 2: Purification

This step is based on three chambers

Dust filter chamber: SO2 is passed though special Dust filters. The solid particles settle down in the dust chamber

Washing tower: SO2 is passed though the Washing or Scrubbing tower in which steam is injected from the top of the chamber solid particles form droplets with steam and settle downDrying tower: SO2 is

passed though the Drying tower in which concentration of H2SO4 is sprayed from the top.

Step 1: Sulfur Combustion

Sulfur is combusted in pyrite burner to produce sulfur dioxide gas.

Chemical Reaction:

 $S + O2 \rightarrow SO2$

Step 3: Oxidation

Now in contact tower, Sulfur dioxide is oxidized to sulfur trioxide by reacting with oxygen in the presence of vanadium pentoxide (V2O5) catalyst. Chemical Reaction:

2SO2 + O2 → 2SO3

Steps of Contact Process

Step 5: Absorption with H2O

After the formation of Disulfuric acid it is reacted with water to form sulfuric acid.

Chemical Reaction:

H2S2O7 + H2O → 2H2SO4

Step 4: Absorption with H2SO4

SO3 is not directly absorbed with water as it forms dense fog with water. Therefore first SO2 is dissolves in H2SO4 and forms Disulfuric acid.

Chemical Reaction:

 $SO3 + H2SO4 \rightarrow H2S2O7$

Applications of Contact Process

Application 1: Fertilizer Production

Sulfuric acid is utilized in the manufacturing of fertilizers, such as phosphoric acid, superphosphate fertilizers, and ammonium sulfate.

Application 2: Chemical Manufacturing

Many chemical processes rely on sulfuric acid as a catalyst or reactant, including the production of dyes, pigments, detergents, and pharmaceuticals.

Application 3: Metal Processing

Sulfuric acid is useful in metal processing, such as pickling, electroplating, and the extraction of metals like copper and zinc.

Conclusion

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Recap of Contact Process

The contact process is a vital industrial method for producing sulfuric acid. It consist of 5 main steps.

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Importance in Various Industries

Understanding the contact process is crucial for industries like fertilizer production, chemical manufacturing, metal processing, and petroleum refining.