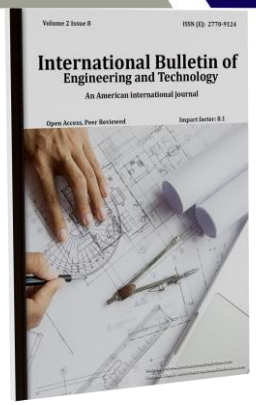

THE SELECTION OF CATALYSTS FOR THE SYNTHESIS OF AROMATIC HYDROCARBONS FROM REDUCED GAS

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https://doi.org/10.5281/zenodo.8080828

Abstract. The synthesis of aromatic hydrocarbons from reduced gas is an important process in the petrochemical industry. Catalysts play a crucial role in this process by promoting the conversion of syngas to desired products. In this study, various catalysts are evaluated for their effectiveness in producing aromatic hydrocarbons. The catalysts are selected based on their physical and chemical properties, including surface area, pore size distribution, and metal composition. The study investigates the impact of different operating conditions on the performance of the catalysts, such as temperature, pressure, and gas composition. The results of this study provide valuable insights into the selection of catalysts for the synthesis of aromatic hydrocarbons and can be used to optimize the process for industrial applications.

Keywords: industry, catalyts, hydrocarbons, gas, metal, synthesis, quality.

The synthesis of aromatic hydrocarbons from reduced gas is an important industrial process that involves the use of catalysts to facilitate the chemical reactions involved. The selection of suitable catalysts for this process is crucial to ensure optimal performance and efficiency [4, 16-17].

There are several factors that need to be considered when selecting catalysts for the synthesis of aromatic hydrocarbons from reduced gas. These include the type of reduced gas being used, the operating conditions of the process, and the desired product yields and quality [5, 4-22].

1. Catalyst activity: The catalyst must have high activity to efficiently convert the reduced gas into aromatic hydrocarbons.

2. Catalyst stability: The catalyst must be stable under the operating conditions to ensure a long service life and minimize replacement costs.

3. Catalyst selectivity: The catalyst must promote the desired product formation while minimizing the formation of unwanted byproducts.

4. Catalyst poisoning: The catalyst may be deactivated or poisoned by impurities in the reduced gas, so it is important to choose a catalyst that is resistant to such effects.

5. Catalyst regeneration: The catalyst may need to be regenerated periodically to maintain its activity and selectivity, so it is important to choose a catalyst that can be easily regenerated.

6. Catalyst availability: The availability of the catalyst must also be considered, as some catalysts may be more difficult or expensive to obtain than others.

7. Safety considerations: Some catalysts may pose safety risks due to their toxicity or flammability, so it is important to choose a catalyst that is safe to handle and use [6, 82]

Some common catalysts used for this process include zeolites, metal oxides, and mixed metal catalysts. Each of these catalysts has its own unique properties and advantages, and the choice of catalyst will depend on the specific requirements of the process.

The selection of catalysts is critical for the synthesis of aromatic hydrocarbons from reduced gas because it directly affects the efficiency and effectiveness of the process. The right catalysts can help to maximize product yields and quality, while minimizing costs and environmental impacts. Here are some of the key reasons why catalyst selection is so important:

1. Type of reduced gas: The composition of the reduced gas can vary depending on the source and production method. Different catalysts may be required to effectively convert different types of gases into aromatic hydrocarbons.

2. Operating conditions: The temperature, pressure, and other operating conditions can also impact the performance of the catalysts. The right catalysts must be able to operate effectively under the chosen conditions to achieve optimal results.

3. Product yields and quality: The choice of catalyst can significantly impact the amount and quality of the final product. Catalysts that promote high selectivity and yield for desired products can help to maximize profits and reduce waste.

4. Cost and environmental impact: The cost and environmental impact of the catalysts themselves must also be considered. Some catalysts may be more expensive or have a higher environmental footprint than others, which can impact the overall economics and sustainability of the process [2, 1-9].

Therefore, selecting the right catalysts is essential for achieving high efficiency, productivity, and sustainability in the synthesis of aromatic hydrocarbons from reduced gas.

There are some ways of selecting catalysts for the synthesis of aromatic hydrocarbons from reduced gas.

1. Identify the desired product: The first step in selecting a catalyst is to identify the desired product and the reaction conditions required to produce it.

2. Evaluate catalyst properties: Once the reaction conditions are known, evaluate the properties of different catalysts to determine which ones are most suitable. This includes considering factors such as activity, stability, selectivity, poisoning resistance, regeneration potential, availability, and safety.

3. Conduct laboratory tests: After narrowing down the list of potential catalysts, conduct laboratory tests to determine their effectiveness under simulated reaction conditions. This can help to further refine the selection process.

4. Conduct pilot-scale tests: Once a promising catalyst has been identified, conduct pilot-scale tests to evaluate its performance under more realistic operating conditions. This can help to confirm its suitability for commercial-scale production.

5. Monitor performance: Once a catalyst has been selected and implemented, monitor its performance over time to ensure that it continues to meet the desired specifications. This may involve periodic testing and maintenance to maintain its activity and selectivity [1, 63-75].

Conclusion. The synthesis of aromatic hydrocarbons from reduced gas is an important industrial process that requires the use of suitable catalysts. The selection of catalysts

depends on several factors, including the type of reduced gas, operating conditions, and desired product yields and quality. Common catalysts used for this process include zeolites, metal oxides, and mixed metal catalysts. By carefully considering these factors, it is possible to choose the right catalysts to achieve high product yields and quality while minimizing costs and environmental impacts.

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