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Gas as a Raw Material for Future Petrochemical Industry

Presenting Author: Majid Sadeqzaddeh
Coauthor(s): Kamyar Keyvanloo
Submitter: Majid Sadeqzaddeh
Corresponding Author: Majid Sadeqzaddeh

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Abstract
Currently the petroleum-derived cuts are the dominant feeds for the petrochemical industry. However, a new situation is being emerged, and the natural gas is coming into play. The rapid growth in the petrochemical/ polymer sector, sensible decline in the world oil reserves, and increased crude oil price, are the reasons behind this evolution. This perspective is much more evident in the Middle East region, where the abundant gas resources can readily be found.

The current paper is developed in two parts. In the first part, the current state of gas in the petrochemical industry is examined. The use of natural gas feed is studied considering different processes and products, geographical situation, added value, and the existing technologies. The second part peruses the changes that occur in this pattern until 2030. Developing technologies, foreseen projects, geopolitical effects, and the final price of different products is completely analyzed and a comprehensive pattern is introduced.

Although different products are under study including Hydrogen, fertilizers (through ammonia), methanol, different polymers, etc.; special attention is given to the polyolefins (i.e. polyethylene, and polypropylene) due to their importance and high volume production. These two products are fully analyzed and the use of ethane crackers is studied in a comprehensive manner.

It has been found that the natural gas can be regarded as a promising feed for the future energy industry due to several reasons, and among all the locations, the Middle East region is considered as the best potential point for such a development. Cheap gas prices, high state of integration between gas refineries, petrochemical complexes, and polymer plants, as well as existing infrastructure for new developments, high ethane content (compared to natural gas derived from other world reserves), are some of the reasons which make the Middle East the core part of this new vision.

This paper is prepared in order to be served as a guideline for the industrial decision-makers, having in mind that the reliable academic and industrial resources used here make this task much easier.