Abstract

Process Economics Program Report 129B

ADVANCES IN CATALYTIC REFORMING

(October 2006)

First commercialized in 1940, catalytic reforming remains the dominant process for producing high octane gasoline blendstocks and refinery hydrogen. Reforming is also a major source of aromatic (benzene, toluene and xylenes (BTX)) petrochemical feedstock. Over 78% of the world's refineries reform naphtha; total capacity is 13 LV% of total crude distillation capacity.

Demands on the catalytic reformer are changing:

a) The trend in gasoline specifications is to further reduce the allowable benzene and total aromatics contents. This is tending to reduce reforming severity and in turn hydrogen production.

b) Refinery hydrogen demand for hydroprocessing is increasing as the trend in fuel specifications is to decrease allowable sulfur in fuels.

c) Global near term demand for petrochemical aromatics lead by para-xylene is forecast to grow by 3.8%/yr to 5.6%/yr from 2005 to 2010. Longer term demand to 2015 is anticipated to grow slower.

d) A new factor in the U.S. and potentially elsewhere is replacement of MTBE with ethanol, which increases the demand for high octane gasoline blendstocks.

Evolution of reformer technology continues. Recent emphasis in catalytic reforming is on catalyst and process improvements to maximize catalyst life and selectivity to hydrogen and BTX aromatics, reforming of ultra low sulfur, low water naphthas, improved reactor internals, improved regeneration processes and revamping of existing units.

This report provides an overview of catalytic reforming developments in catalyst, process and hardware technologies since PEP Report 129A, "*Advances in Catalytic Reforming"*, issued in 1996. The report then develops process economics for reforming a paraffinic, straight run naphtha and a dehexanized naphtha in continuous catalytic regenerated units. Also, a paraffinic raffinate from aromatics extraction is reformed in a semiregenerative unit to produce a high aromatic reformate for aromatics extraction.

Professionals and managers who manage, research, develop, plan, operate, design plants or manage investments in the petroleum refining and allied industries could benefit from the information contained in this report.

SRI Consulting

SRI CONSULTING

Report No. 129B

ADVANCES IN CATALYTIC REFORMING

by Richard N ielsen

October 2006

A private report by the

PROCESS EC ONOMICS PROGRAM

Menlo Park, California 94025

SRIC agrees to assign professionally qualified personnel to the preparation of the Process Economics Program's reports and will perform the work in conformance with generally accepted professional standards. No other warranties expressed or implied are made. Because the reports are of an advisory nature, neither SRIC nor its employees will assume any liability for the special or consequential damages arising from the Client's use of the results contained in the reports. The Client agrees to indemnify, defend, and hold SRIC, its officers, and employees harmless from any liability to any third party resulting directly or indirectly from the Client's use of the reports or other deliverables produced by SRIC pursuant to this agreement

For detailed marketing data and information, the reader is referred to one of the SRI Consulting programs specializing in marketing research. THE CHEMICAL ECONOMICS HANDBOOK Program covers most major chemicals and chemical products produced in the United States and the WORLD PETROCHEMICALS PROGRAM covers major hydrocarbons and their derivatives on a worldwide basis. In addition the SRIC DIRECTORY OF CHEMICAL PRODUCERS services provide detailed lists of chemical producers by company, product, and plant for the United States, Western Europe, Canada, and East Asia, South America and Mexico.

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

CONTENTS (Continued)

CONTENTS (Concluded)

ILLUSTRATIONS

ILLUSTRATIONS (Concluded)

TABLES

TABLES (Continued)

TABLES (Continued)

TABLES (Continued)

TABLES (Concluded)