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D00283



Distribution
LIMITED

ID/WP. No. 111
20 October 1969

ORIGINAL: ENGLISH

United Nations Industrial Development Organization

United Nations Industrial Development Organization
Development of the United Nations Industrial Development
Developing Countries

IND/SYD/E/15

1969, 10/20 - 1 October 1969

THE PROCESS FOR THE PRODUCTION OF MALEIC
ANHYDRIDE THROUGH DIRECT OXIDATION OF

1/ n-BUTYL ENES

by

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U.S.S.R.

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We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.

My name is Shakhtakhtinsky, I represent the Soviet Union, and I will speak in Russian.

You will not find my paper listed in the programme of the Symposium, but as Professor R. G. Ismailov referred in his review of the development of the petrochemical industry and petrochemical research in Azerbaidzhan to the process for producing maleic anhydride from n-butylenes, I asked for the floor in order to give some details of this process.

A process has been developed in the Baku Petrochemical Processes Institute for the production of maleic anhydride by the direct oxidation on n-butylenes in a fluidized bed of catalyst. The catalyst used in this process is a mixture of oxides of metals of variable valency, deposited on silica gel to form balls 2-3mm in diameter. The process equipment consists of a reactor with a fluidized bed of catalyst, a freezing condenser for extracting from the reaction gases up to 25 per cent of the maleic anhydride, an absorption column for absorbing the remaining maleic anhydride in water, and a system for the fumarization of this residue. The process thus gives two products of commercial value: maleic anhydride and fumaric acid. The process parameters are as follows: temperature 460-470°C, contact time 0.5-0.6 second, and content of n-butylenes in the raw material 5-6 per cent. For every 100 parts by weight of n-butylenes used, 50 parts by weight of maleic anhydride and 5-6 parts by weight of fumaric acid are formed. The relatively high output per unit of reaction surface achieved with the process under discussion should be noted: this process gives a yield of 150-160g of maleic anhydride per litre of catalyst per hour, while the process for the production of maleic anhydride from benzene (as used, for example, by the Montecatini concern) gives a yield of only 70-80g of maleic anhydride per litre of catalyst per hour. This relatively high efficiency of the catalyst is due primarily to the reaction system, which has made it possible to increase the content of n-butylenes in the raw material to 5-6 per cent.

I should like to say a few words more about the economics of the process we have developed: the cost of the maleic anhydride produced with this process is 330 roubles per tonne, whereas maleic anhydride produced from benzene costs about 450 roubles per tonne and maleic anhydride produced from n-butylenes with a stationary bed of catalyst costs 420 roubles per tonne (all costs calculated

on the basis of the price for pure butylene). There is thus a cost advantage of about 20 per cent over the benzene method.

I should like to draw your attention to the fact that we have developed two variants of our process: one variant using a pure butylene fraction as the raw material, and the other variant using a cheap butane-butylene fraction. This second variant is even more advantageous from the economic point of view, of course, as the yield of products remains the same with respect to the amount of butylenes. In our view, the process for producing maleic anhydride from butylenes has better future prospects, generally speaking, than the process based on benzene. I feel that the whole idea of producing maleic anhydride from benzene is not quite right, as it is based on the combustion of two carbon atoms to carbon dioxide, while in the butylene process the four carbon atoms correspond to the four carbon atoms in maleic anhydride. Moreover, as there is a current tendency towards the production of butadiene by the pyrolysis of various liquid raw materials, with simultaneous formation of ethylene and butadiene (as already described by Dr. Kemptner at this Symposium), rather than by the dehydrogenation of butane and butylenes, it is naturally to be expected that in the near future there will be a surplus of butylenes, with a concomitant fall in their price. This is a further point in favour of the process for producing maleic anhydride from n-butylenes.

In conclusion, I should like to express my gratitude to the Chairman for having given me an opportunity to speak in spite of the limited time available.

Thank you all for your attention.





7 . 4 . 72