(10-t) Tom 132 760

Item 7.9

Memorandum concerning the future development of the Alkazid and Claus-kiln process

Efforts must be made in the development of the Alkazid-process to design a simpler and cheaper apparatus. With respect to the Alkazid-solutions it must be said that important improvements cannot be expected in the near future. The following types of solutions should be used.

1. Alkazid solution M is suitable for the extraction of H_2S or CO_2, separately or in mixture, whereby either H_2S or CO_2 can be removed. The gases to be purified must be free from carbon disulfide.
2. Alkazid solution DiK is suitable for the extraction of H_2S from carbondisulfide-containing gases without a simultaneous extraction of the CO_2.

At first the DiK-solution consisted of the potassium salt of diethylglycocall because the Ludwigshafen-factory was in the position to furnish the commercial solution. Since the basic material, the diethylamine, requires a special process for its production we intend to apply in the future the potassium salt of the dimethylglycocall because the dimethylglycocall is a by-product of the methylamine factory which could not be easily sold. Ludwigshafen is now able to furnish a commercially suitable solution. Test runs are now being carried out in order to investigate the substitutes, in addition 20 cu. m. of the solution have been ordered which will be used for the desulphurization of the hydrogenation.

According to our opinion it is not necessary to carry on any research work for the improvement of the M-solution. A better design of the apparatus and the application of a cheaper fuel than steam should secure a more economical CO_2-extraction. All efforts which have the aim to improve the economy of the alkazid process can be subdivided in such a way to secure a cheaper H_2S-extraction or a CO_2-extraction respectively. The economy of the H_2S-extraction can be greatly improved if the H_2S which has been absorbed by the Alkazid solution and leaves the stripping column is directly led after cooling to a burner by which it is burned to sulfur after adding the theoretically necessary volume of air. The heat units which are generated by the combustion of the stripped H_2S are transferred to the enriched solution to be stripped thus furnishing the heat required for the stripping process. The formed elementary sulfur is withdrawn from the boiler.

The H_2S-SO_2 containing waste gases are passed through a final catalyst and transformed into sulfur. The fluctuation of the volume of the stripped hydrogen sulfide is compensated by the automatically controlled regulation of the air necessary for the combustion. Fluctuation of the furnished H_2S-volume and of the gas volume which is required for the stripping process are compensated by an auxiliary steam operated heating element which is installed in the column. By the application of the proposed method it is now possible to utilize one and the same apparatus for both the extraction of the H_2S and its combustion to elementary sulfur and to use the generated heat of combustion for the stripping of the enriched solution. Depending on the absorbed volume of H_2S the formerly necessitated steam can be saved except for a small volume of control-steam. With respect to the apparatus the boiler of the claus-kiln, gasholder, H_2S-blower, and the complicated pipe system can be abandoned thus resulting in a simpler and cheaper installation.

Preliminary experiments have been carried out for two months whereby fuel gas instead of H_2S was applied to strip the enriched solution. Apparatus which is suitable for trying the proposed method is now being constructed. The working conditions of a bubble-plate column shall be tried out simultaneously.

CO_2-extraction

The steam costs influence unfavorably the economy of the CO_2-extraction. The time passage for the CO_2-extraction which is as long as 1 minute is very high, resulting in very large scrubbing towers which are not only expensive but require a large volume of Alkazid solution. In order to lower the costs, experiments are carried out to use a special packing material, especially the Intos-hurdles seem to be of some advantage.

In order to lower the steam consumption one could think of improving the CO_2-content of the enriched solution or to apply solutions which have a higher absorptiveness. Such a way is promising only if the absorbing velocity is increased simultaneously. The salts of the polyethyleneaminoacetic acid are substances which are in compliance with the above mentioned demands. The savings of steam however are not very great because beginning with a certain concentration (30 vol. CO_2 per 1 vol. solution) the steam consumption depends more and more on the CO_2-concentration of the solution, because additional steam is required for the decomposition of the salts. For that reason it seems to be of a greater advantage to try to utilize the vapors which leave the stripper or to apply cheaper fuel for the stripping process than steam. The heat of the vapors can be utilized by subdividing the stripping column into several units which are operated in series and with different pressures. The vapors which leave the column which is operated under a higher pressure heat the following column. The systems 1 and 2 shall be operated according to the proposal. There seems to exist another possibility in the use of a steam pump, but according to previously performed calculations the efficiency is very low due to the CO_2-content of the vapors.

It should also be possible to heat the solution with coal or briquettes instead of steam. This method should be applicable to large plants, such as the Ruhland plant for instance and should be superior to the steam heating

Clausanlage:

The claus-kiln seems to be developed to such a degree that not much time must be devoted for improvements. It is only necessary to replace the Bauxite-catalyst which has the tendency to disintegrate very easily by the artificial catalyst which has been developed by Dr. Braus.