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 KRUPP-KOPPERS GMBH *FR 2520-002-A
 21.01.82-DE-201776 (22.07.83) C01b-03/02 C07c-29/15 C07c-
 31/04 C10k-01/08 C10k-03/04
 Low-temp. wash system for partial oxidn. gas - gives gas for
 methanol and ammonia synthesis not needing sec. sulphur removal

E(31-A, 31-H3, 31-N5) J(1-E3)

C83-079680

Gas for methanol synthesis (A) and NH_3 synthesis (B) is prepd. as follows from crude synthesis gas:
 (i) crude gas is passed to a low-temp. H_2S wash tower (C) and then divided into a stream which enters the upper or middle part of a low-temp. CO_2 wash tower (D), and the remainder, which is catalytically converted, part of the converted prod. being sent to the lower part of (D) and the remainder (E) being treated in step (iii); (ii) the gas from (D) is sent to (A); (iii) stream (E) is sent to the lower part of a 2nd low-temp. CO_2 wash tower (F); purge gas from (A) enters the upper or middle part of (F); and (iv) the gas from (F) is washed with liq. N_2 and sent to (B).

Stages (C), (D) and (F) use the same wash liq. which, on leaving (C), is regenerated and passed to the top of (F); while liq. from (D) and (F) is stripped and sent to (C), (D) and (F).

ADVANTAGES

Further S removal from the feed to (A) is unnecessary. The purge from (A) is not burnt, but used without added cost.

DETAILS

The liq. in (C), (D) and (F) is pref. methanol, used at -20 to -60°C . Stripping of the wash liq. from (D) and (F) can be by injection of inert gas at reduced pressure and low temp. Pref. 99-70 vol.% of the gas from (C) is converted. The CO_2 content of the gas for (A) can be controlled via the flow rate of stripped wash liq. to (D). In the gas for (A), the concn. ratio $(\text{H}_2 - \text{CO}_2)/(\text{CO} + \text{CO}_2)$ is pref. 2 or more; this ratio can be adjusted via the proportion of gas from (C) which is converted.

The gas from (C) to be converted may be reheated by heat exchange with the compressed crude gas. The necessary cooling after conversion can be done by exchange with gas leaving (D), or with gas for (B) after liq. N_2 wash.

EXAMPLE

158000 $\text{N m}^3/\text{h}$ crude gas from the Koppers-Totzek process for partial oxidn. of coal, comprised (vol.%) 10.6 CO_2 , 62.5 CO , 24.6 H_2 , 0.4 H_2S , 0.1 COS and 1.8 ($\text{N}_2 + \text{Ar} +$

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CH₄). It was treated by the process described. There was produced 66,800 N m³/h methanol synthesis gas contg. (vol.%) 3.1 CO₂, 26.7 CO, 68.2 H₂ and 2.0 (N₂ + Ar + CH₄) and less than 0.1 ppm S; and 110900 N m³/h ammonia synthesis gas contg. (vol.%) 75 H₂ and 25 N₂. 22000 N m³/h purge gas from methanol synthesis was sent to (F), and contained (vol.%) 4.0 CO₂, 19.5 CO, 69.2 H₂, 6.3 (N₂ + Ar + CH₄) and 1.0 MeOH. (16pp1492DwgNo0/0).

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