Patent Claims

1. A method for the production of hydrogen (5) from a hydrogen sulphide and ammonia containing first feed steam (1), comprising:

(a) oxidizing part of the hydrogen sulphide content of said first feed stream (1) in a flame region in a Claus furnace (C) to form sulphur dioxide, and reacting hydrogen sulphide and sulphur dioxide in the furnace (C) and in downstream catalytic reactors (K) to form sulphur;

(b) introducing into the Claus furnace (C) as second feed stream (2) pure oxygen or oxygen enriched air to achieve a temperature to within a range of 1300-1500°C, and providing conditions for a high level of hydrogen sulphide dissociation into hydrogen and sulphur;

(c) controlling the Claus furnace temperature, so not to cause refractory damage;

(d) quenching the Claus reaction furnace exhaust gas (7) upstream the catalytic reactors (K) in less than 6 milliseconds to a temperature below 150°C;

(e) extracting sulphur from the gas downstream the quench and downstream the catalytic reactors (K);

(f) hydrotreating the exit gas (8) from the catalytic reactors (K) in a hydrodesulphurisation unit (H) to form a hydrotreated gas (9), and

(g) separating off hydrogen (5) from the hydrotreated gas (9),

wherein the amount of oxygen supplied to the Claus reactor furnace (C) is controlled in such a way that the H_2S:SO_2 ratio at the exit of the final Claus catalytic stage (K) is 20:1 or higher.

2. The method according to Claim 1, wherein the Claus reaction furnace exhaust gas (7) is quenched via a waste heat boiler (W), whose heat transfer tubes have internal diameter of 0.5-2 inches.

3. The method according to Claim 1, wherein the Claus reaction furnace exhaust gas (7) is quenched via direct water quench (D).

4. The method according to Claim 1, wherein the Claus reaction furnace exhaust gas (7) is quenched via an expansion orifice (O).

5. A method according to any of Claims 1 to 4, wherein the hydrotreated gas (9) is cooled in a direct water quench (Q) bevor it is passed through an amine wash (A) to receive an acid gas stream (3) consisting predominantly of H_2S for recycle to the Claus reaction furnace (C), as well as an exit stream (4), rich in hydrogen.

6. The method according to Claim 5, wherein the hydrogen-rich exit stream (4) is treated by pressure swing absorption or a membrane process (P) to receive a hydrogen product (5).