Process for producing hydrogen sulfide in a circulating catalytic bed reactor

The subject of the present invention is the preparation of hydrogen sulfide from elemental sulfur and hydrogen, by a continuous process using a catalyst in a moving bed (or circulating bed).

Hydrogen sulfide (H_2S) is a chemical intermediate used in many industrial processes, for example for the preparation of organosulfur compounds, or in sulfurizing treatment such as (and non-limitingly) for sulfurizing catalysts that are used in hydrotreating reactions in the refining and petrochemical fields.

Hydrogen sulfide may be prepared in a manner known *per se*, by reacting elemental sulfur in liquid or gaseous form, and hydrogen, optionally in the presence of a catalyst based on hydrogenating metals. Industrial processes are often carried out at high temperatures, especially as the reaction is known to be highly exothermic.

In order to obtain a satisfactory yield of hydrogen sulfide, it is often necessary to perform the reaction at high pressure and/or to use a stoichiometric excess of sulfur.

Summary

The applicant has now developed an innovative process for producing hydrogen sulfide from hydrogen and sulfur, which makes it possible to resolve certain drawbacks of the prior art processes.

In one aspect, the present disclosure refers to a process for producing hydrogen sulfide from hydrogen and elemental sulfur, comprising the following steps:

(a) bringing the sulfur into contact with a solid catalyst comprising at least one metal, chosen from metals from groups VIB

and VIII of the Periodic Table of the Elements, in metal sulfide form, at a temperature ranging from 120°C to 160°C;

(b) circulating the mixture of sulfur and catalyst resulting from step (a) in a reaction zone, in which said mixture is brought into contact with hydrogen, the reaction zone having a temperature at the inlet point of the catalyst of greater than or equal to 150°C and a temperature at the outlet point of the catalyst of less than or equal to 300°C, and a pressure of less than or equal to 3×10^5 Pa;

(c) separating the catalyst and the gaseous effluents containing hydrogen sulfide; and

(d) recycling the catalyst to step (a).

Description

The process according to the present invention is characterized in that it comprises the following steps:

(a) bringing the sulfur into contact with a solid catalyst comprising at least one metal, chosen from metals from groups VIB and VIII of the Periodic Table of the Elements, in metal sulfide form, at a temperature ranging from 120°C to 160°C;

(b) circulating the mixture of sulfur and catalyst resulting from step (a) in a reaction zone, in which said mixture is brought into contact with hydrogen, the reaction zone having a temperature at the