



US006652826B1

(12) **United States Patent**  
Chowdhury et al.

(10) **Patent No.:** US 6,652,826 B1  
(45) **Date of Patent:** Nov. 25, 2003

(54) **PROCESS FOR ELIMINATION OF LOW CONCENTRATIONS OF HYDROGEN SULFIDE IN GAS MIXTURES BY CATALYTIC OXIDATION**

(75) Inventors: **Aminul Islam Chowdhury**, Calgary (CA); **Eric Lars Tollefson**, Calgary (CA); **Tushar Kanti Ghosh**, Stilwater, OK (US)

(73) Assignee: **Xergy Processing Inc.**, Calgary (CA)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **08/487,629**

(22) Filed: **Jun. 7, 1995**

#### Related U.S. Application Data

(63) Continuation of application No. 08/079,831, filed on Jun. 22, 1993, now abandoned, which is a continuation of application No. 07/655,281, filed on Feb. 14, 1991, now abandoned, which is a continuation of application No. 07/370,824, filed on Jun. 23, 1989, now abandoned.

(51) **Int. Cl.<sup>7</sup>** ..... **C01B 17/04**

(52) **U.S. Cl.** ..... **423/573.1; 423/576.2; 423/576.8; 423/245.1; 95/143**

(58) **Field of Search** ..... **423/224, 230, 423/244.01, 244.03, 245.1, 573.1, 576.2, 576.8, 220; 95/90, 135, 136, 143**

(56) **References Cited**

#### U.S. PATENT DOCUMENTS

2,899,474 A	*	8/1959	Ricards	260/676
3,391,988 A	*	7/1968	Friess	23/2
4,196,183 A	*	4/1980	Li	423/573 G
5,256,384 A	*	10/1993	Rolke et al.	423/220
5,916,438 A	*	6/1999	Trocciola et al.	210/188

#### FOREIGN PATENT DOCUMENTS

CA	766568	*	9/1967
CA	1117276	*	2/1982

#### OTHER PUBLICATIONS

Kohl et al. "Gas Purification" 4th Ed. Gulf Publishing Co. Houston TX USA, pp. 442-449, ISBN No. 0-87201-314-6. 1985.\*

"Gas Purification", 4th ed. by Kohl et al. Gulf Publishing (1985) U.S.A., pp. 442-446.\*

\* cited by examiner

*Primary Examiner*—Wayne A. Langel

*Assistant Examiner*—Timothy C. Vanoy

(74) *Attorney, Agent, or Firm*—William H. Holt

(57) **ABSTRACT**

A process is described for the elimination of hydrogen sulfide from gas mixtures by catalytic oxidation over activated carbon catalyst which converts the hydrogen sulfide to elemental sulfur and water, the former being sorbed by the activated carbon while the latter is transported with the gas mixture and may be removed by known dehydration processes. The above oxidative process is conducted at elevated temperatures and pressures and with sufficient residence time to assure virtually complete conversion of the hydrogen sulfide with minimal production of by-product sulfur dioxide. Traces of heavy hydrocarbons in the feed gas mixture which may reduce the life of the catalyst and the quality of the sulfur product may be removed by cryogenic means or by sorption on an activated carbon guard bed. Both the activated carbon catalyst used to oxidize the hydrogen sulfide and the activated carbon used to remove heavy hydrocarbons from the feed gas may be regenerated by passing inert gas or product gas through the beds of these materials at elevated temperatures for sufficient time to remove the sorbed sulfur or the heavy hydrocarbons, respectively for use as by-products of the process.

**15 Claims, 7 Drawing Sheets**

