



Sodium Sulfide & Hydrosulfide

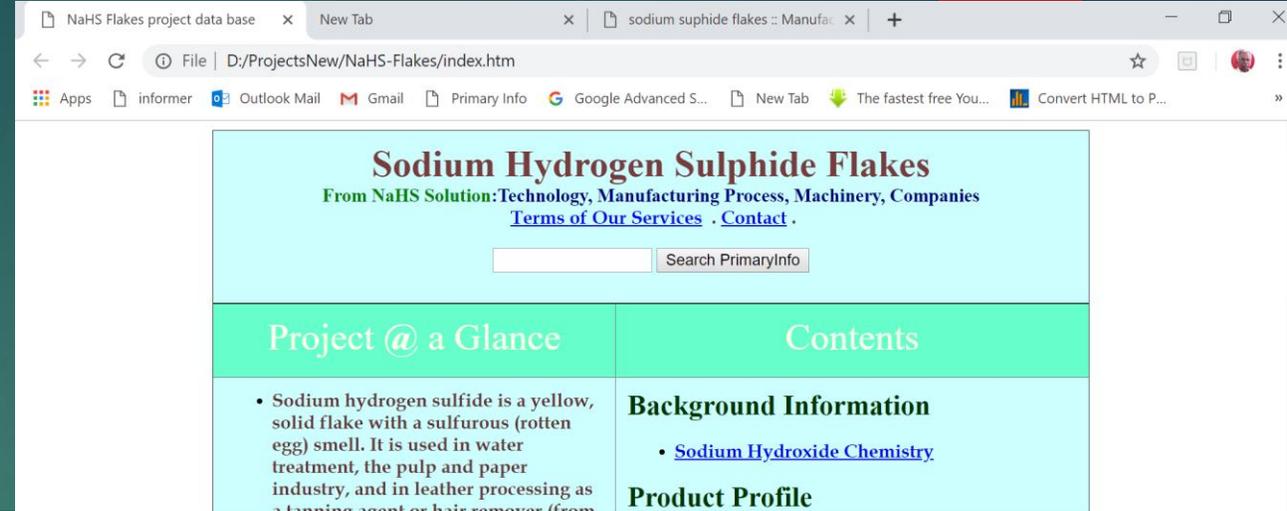
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Sodium sulfide is colorless or slightly yellow crystals of the cubic system

Sodium hydrosulfide

NaHS is colorless or yellow crystals



Sodium sulfide is produced by the following methods:

- The reduction of sodium sulfate by solid carbonaceous materials;
- The reduction of sodium sulfate by gaseous reducing agents;
- The absorption of hydrogen sulfide by sodium hydroxide;
- The exchange decomposition of barium sulfide with sodium sulfate, carbonate, and hydroxide;
- The electrolytic (amalgam) method.



Sodium sulfide is also obtained as a byproduct in the production of barium carbonate

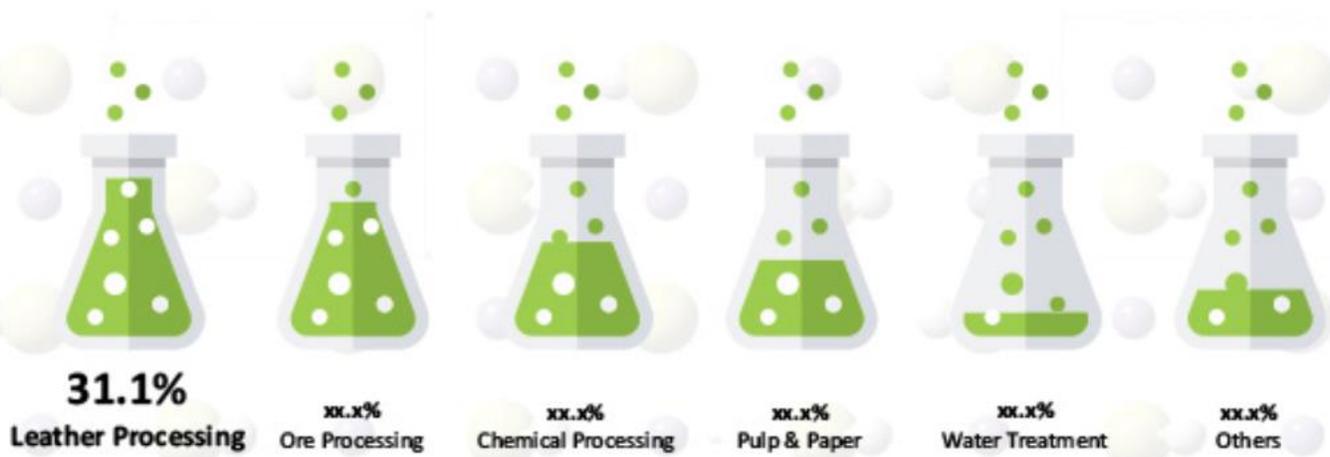
Small amounts of **technical sodium hydrosulfide** are obtained from the flue gases of organic synthesis

Sodium hydrosulfide of lower quality is obtained by using hydrogen sulfide - a byproduct in the process of oil and gas processing, organic synthesis and others.

Global Sodium Sulfide Market Value Share (%)

By Application (2016)

2016 – 2024 at a CAGR of **3.3%**



Source: Persistence Market Research, 2016



Methods of production of
sodium hydrosulfide:

Absorption of hydrogen sulfide with
sodium hydroxide



Patents

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[45] MAR. 21, 1964

[54] **PRODUCTION OF SODIUM HYDROSULFIDE**
2,662,000 12/1953 Maschwitz 423/560
3,839,548 10/1974 Jackson 423/560

[75] Inventor: **James L. Manganaro, Hightstown, N.J.**

[73] Assignee: **FMC Corporation, Philadelphia, Pa.**

[21] Appl. No.: **227,307**

[22] Filed: **Jan. 22, 1981**

[51] Int. Cl.³ **C01B 17/32; C01B 17/42**

[52] U.S. Cl. **423/560; 423/561 A**

[58] Field of Search **423/560, 561 P, 512, 423/511**

[56] **References Cited**
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2,409,392	10/1946	Saddington	423/560

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Przemysl Chemiczny 45/5, 1966, pp. 271-272, by Czesiawa Bandrowska.
Primary Examiner—Gary P. Straub
Attorney, Agent, or Firm—Edwin B. Cave; Christopher Egolf

[57] **ABSTRACT**
Sodium hydrosulfide is continuously produced from the reaction of hydrogen sulfide and sodium hydroxide continuously introducing a solution into an unvented reactor which may be a tower or tank, while continuously withdrawing aqueous sodium hydrosulfide from the chamber.

8 Claims, N

Manufacture of sodium sulfides x US2409392A.pdf

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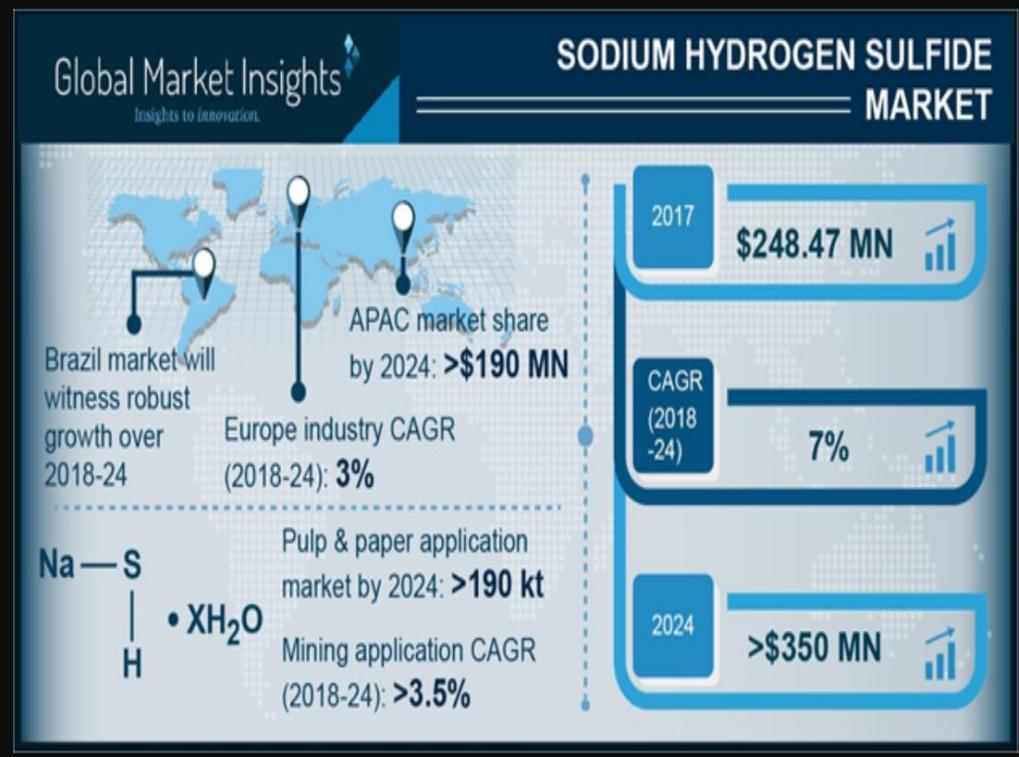
2,409,392
MANUFACTURE OF SODIUM SULFIDES
Arthur W. Saddington, Syracuse, N. Y., assignor to The Solvay Process Company, New York, N. Y., a corporation of New York
Application October 9, 1943, Serial No. 505,596
10 Claims. (Cl. 23-134)

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This invention relates to the manufacture of sodium hydrosulfide (NaHS) or sodium sulfide (Na₂S) or mixtures of both.
It is known that sodium hydroxide may be reacted with H₂S to form Na₂S which may be treated with more H₂S to convert Na₂S to NaHS, and it has been proposed to make sodium hydrosulfide by gassing an Na₂S-NaHS liquor with pure hydrogen sulfide.
In processes of the type to which the invention relates, the source of sodium is commercial caustic soda which contains appreciable quantities of impurities, such as iron, copper, nickel, manganese and silicon. These impurities do not discolor caustic soda to any great extent, and hence their presence in commercial caustic is unobjectionable. However, during H₂S gassing of commercial caustic liquor, such impurities pass thru the process and are carried into the resulting NaHS liquor. Such impurities may be present in the NaHS liquor as soluble salts or suspended in finely divided condition. While probably largely sulfides, exact compositions of the impurities are not known, and whatever their nature, these substances are referred to herein as metallic impurities. The presence of even small amounts of these impurities in Na₂S or NaHS solutions results in products of very

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soda as the source of sodium, coagulation and precipitation of metallic impurities are not obtained consistently even when pure H₂S gas is used and even though the liquor has been gassed with a large excess of H₂S. Thus, while the prior art indications are that coagulation and precipitation of metallic impurities may be had by gassing the liquor to such an extent that the liquor contains no Na₂S and then using an excess of H₂S, I find these conditions are not controlling in all circumstances, and have discovered that coagulation and precipitation of impurities are dependent upon the composition of the NaHS liquor with respect to carbonate of sodium and Na₂S content. While not identified with certainty, indications are that the carbonate of sodium present in the system is in the form of Na₂CO₃ and for convenience will be referred to as such in this specification.
It will be understood that good grades of commercial caustic soda contain appreciable amounts, sometimes as much as 0.16-0.20%, of Na₂CO₃. Further, synthetic H₂S gas also contains appreciable quantity of CO₂ as an impurity, while the more common hydrogen sulfide gases, such as those formed in oil refining operations, often contain as much as 10-25% CO₂ by volume.
A principal object of this invention lies in pro-

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Questions?

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