Institute of Chemical Engineering

Review of the hydrogen sulfide removal methods

Publication date:	29.12.2022
Publication title:	Review of the hydrogen sulfide removal methods
Authors:	Tadeusz Kleszcz, Mikołaj Suwak
Journal information:	Prace Naukowe Instytutu Inżynierii Chemicznej Polskiej Akademii Nauk
Tags:	hydrogen sulfide, utilization of hydrogen sulfide, catalytic oxidation of hydrogen sulfide

Abstract: The issue of utilization of hydrogen sulfide and the reduction of its emissions is a key issue and results from its extraordinary toxicity to both humans and the environment. Due to the strong corrosive properties of H_2S, its removal is necessary in every industrial process in which it is present. As the most significant desulfurizing process is considered the Claus process. It is the most widely used method and it is estimated that around 90 - 95% of all recovered sulfur in the world comes from this process. However, the Clauss plant outlet gas typically contains 3 to 5% H_2S, so further processes are still required to reduce the hydrogen sulfide concentration to regulations-acceptable levels. This is usually done by catalytic hydrogen sulfide oxidation. Alumina is used as the most common catalyst. Contemporary research in this area focuses on modifying the hierarchical pore structure of Al_2O_3 and testing obtained alumina as a carrier for active ingredients such as metals and metal oxides. An interesting solution proposed by modern researchers may also be the use of silicon and titanium oxides as carriers for vanadium oxide. An alternative solution to the catalytic combustion of hydrogen sulfide is chemisorption. Theoretically, chemisorption allows the achievement of much lower concentrations of hydrogen sulfide at lower operating costs. The most popular adsorbents include zeolites and activated carbons. Modern research in this field consists in obtaining composite materials based on zeolites or activated carbons. This is usually done by impregnating said materials with metal/metal oxides. It is worth noting that in the case of activated carbons, the interest of scientists also includes obtaining activated carbons from the most ecological materials, such as biomass. Given the growing interest in green materials in general, interest in biochars can be expected to increase

in the future.

Attachments:

Zeszyt-26-2022 pdf, 4.08 MB

Created at:	05.08.2025
Published by:	Artur Wojdyła
Published at:	05.08.2025 12:29
Number of downloads:	37

Tagi: hydrogen sulfide, utilization of hydrogen sulfide, catalytic oxidation of hydrogen sulfide

Metryczka

Published by:	Artur Wojdyła
Published at:	06.08.2025 08:51
Number of views:	27