Sorption of H_2S on water treatment residuals generated during drinking water treatment

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Water treatment residuals (WTR) are by products generated from deironing and demanganization of underground water or from the addition of alum or ferric salts used in the coagulation process during surface water treatment. Reuse of WTRs is achievable due to its low cost and availability as each year several million tons of sludges are produced. Due to the high content of iron compounds and the associated high reactivity, WTRs can play a major role in the immobilization and sortpion of organic and inorganic contaminants. WTRs have also the ability to sorb H_2S and can be used in sewage systems to minimalize the problem of corrosion of sewage pipelines.

The source of H_2S was a synthetic mixture of H_2S and nitrogen as a carrier gaz. The gas flowed through the column filled with WTRs samples. During the experiment, sorbent samples was taken periodically (1-30 days).

The major component of WTRs was Fe_2O_3 (40-60%). The results of the X-ray diffraction indicated that amorphous substances prevails. WTRs are mesoporous material with large surface area, exceeding $130 m^2/g$. The greatest differences in sorption amount were observed within the first 3 days of the reaction. Within 1 day, only half of the initial concentration remained. A major decrease in the concentration of H_2S between 1 and 3 day was observed. Afterwards, the concentration of H_2S was constant. Hence, 3 days was sufficient for the complete sorption of H_2S.

WTRs can be effective sorbent of gasous H_2S. However, more research including sorption mechanism and determination of the total sulfur content (elemental analysis) should be provided.

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