

A SOLUTION TO THE CORROSION AND PROBLEMS RELATED TO THE RELEASE

Brucite+ presents MagTreat®, a suspension of magnesium hydroxide made from brucite ore for use in wastewater treatment systems, as well as other applications. A safe and eco-friendly product, it raises the pH of wastewater protecting the sewage system from corrosion.

The problem of the corrosion of sewage systems is especially severe in some areas. As usual, this is a result of a number of physical and chemical factors.

The first factor has a hydrodynamic nature: as a rule, it is water streams that flow at a high speed or fall from a high height that sometimes reaches up to 60 meters. It has been optimised by the proper configuration of the sewage system and flows.

The second factor is usually a complex biochemical process. When the initial effluent has an acidic reaction and carries sulphur-containing compounds, for example, sulphates, hydrogen sulphide (H_2S) is released from water into the gas phase with the appearance of a strong unpleasant smell. The released gas is adsorbed on the concrete walls of the sewer and is gradually oxidized by thiobacteria

If there is no release of hydrogen sulphide into the gas phase, then there is no biochemical corrosion of the sewage system



OF SEWAGE SYSTEMS

OF HYDROGEN SULPHIDE



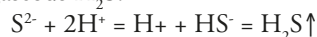
MagTreat

By Brucite+

to sulphuric acid (H_2SO_4), which begins to corrode the concrete, as evidenced by a drop in its pH. If this process is uncontrolled, then the result is the destruction of the sewer. The speed of this process depends on the concentration of hydrogen sulphide, the grade of concrete and the presence/absence of a protective layer.

Schematically, this process can be represented as follows:

One of the most effective solutions to this problem is to adjust the pH of wastewater from acidic to basic. As a result, the equilibrium of the reaction below shifts to the left, contributing to the formation of aqueous S^{2-} and not gaseous H_2S .

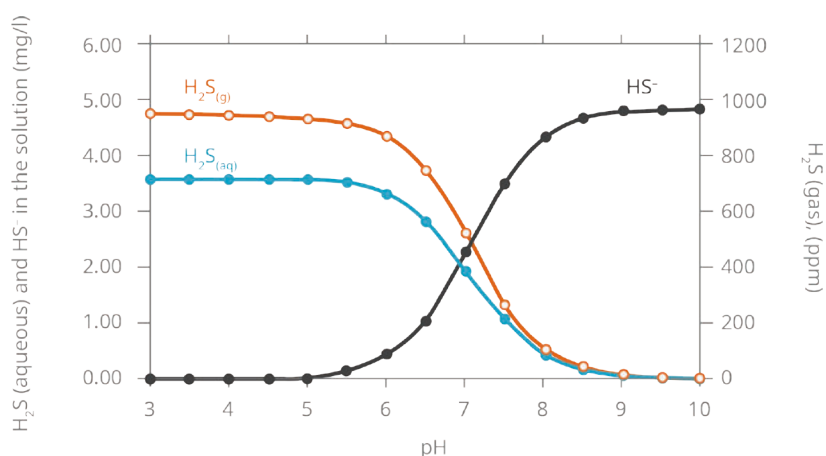


Aqueous phase Gas phase

Below you can find a phase diagram showing the concentration of all substances depending on pH:

into the gas phase, then there is no biochemical corrosion of the sewage system.

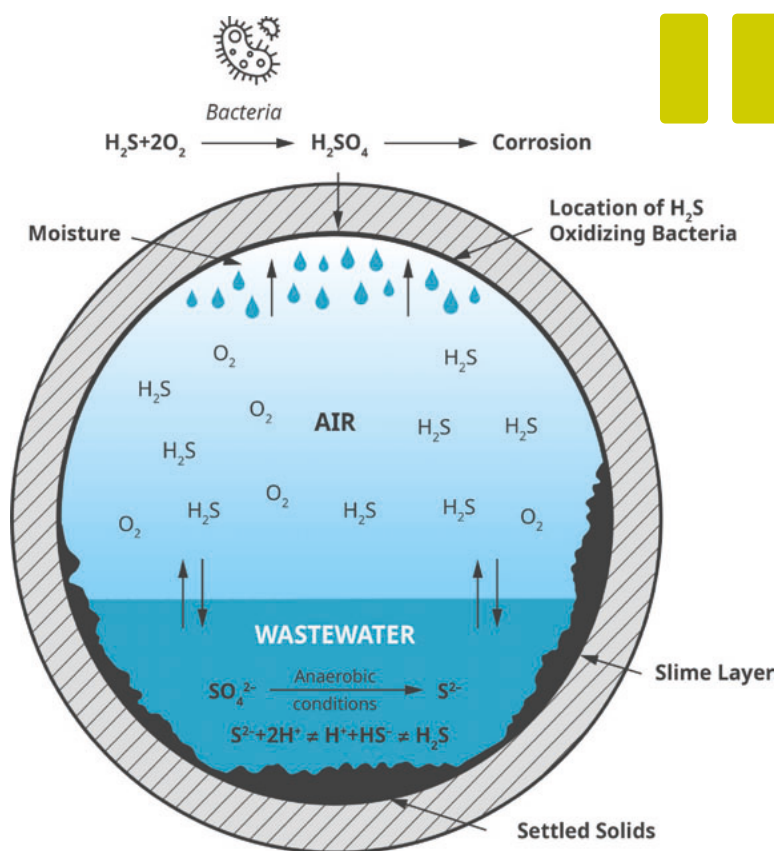
The MagTreat®-S reagent by Brucite+ produced on the basis of natural magnesium hydroxide is the most effective and at the same time safe alkali, giving many more hydroxide ions than caustic soda (NaOH) for example.



As can be seen at the pH of 8.5, the release of gaseous H_2S drops almost to zero. If there is no release of hydrogen sulphide

The reagent also provides a very high buffering capacity of wastewater, which prevents the loss of alkalinity with time

The MagTreat®-S reagent by Brucite+ produced from natural magnesium hydroxide is the most effective and at the same time safe alkali



Carbon Footprint Ltd. has provided a life cycle assessment of MagTreat®-S which has been acknowledged as a CO₂e accessed product

resulting in a pH decrease (acidification) after the dosing of the reagent into the system.

So how does it work? Typically, the reagent is introduced into the sewage system where the wastewaters are collected and starts its way to the municipal wastewater treatment plant. In this case,

wastewater does not emit H_2S along its entire path and comes with an already optimum pH of 8-8.5 for biological treatment.

Magnesium hydroxide is classified as sparingly soluble in water. Inside wastewater with an acidic reaction MagTreat® begins to dissolve gradually releasing magnesium cations and hydroxide anions that neutralize the acids. Due to its limited solubility, MagTreat® is consumed gradually, providing the system with a "buffer effect". Divalent Mg^{2+} cations are involved in the processes of coagulation, compaction of sewage sludge, and are also micro-nutrients for activated sludge bacteria. Due to the formation of insoluble or poorly soluble salts with various anions, MagTreat® is used to precipitate phosphates, magnesium-ammonium phosphates, fluorides, and regulates the content of sulphides, resulting in the reduction of odour in the wastewater treatment plant. Hydroxide anions promote the precipitation of heavy metals in the form of insoluble hydroxides. Magnesium hydroxide forms insoluble magnesium-ammonium phosphate with phosphate and ammonium ions, decreasing the N and P load in wastewater.

Moreover, MagTreat®-S is a safe and eco-friendly product. Recently Carbon Footprint Ltd. has provided a life cycle assessment of MagTreat®-S which has been acknowledged as a CO₂e accessed product. The assessment was dedicated to the greenhouse gas emissions associated with 1 kg of the product. This analysis focused on the embodied raw material emissions, the transport of these materials, the manufacture, processing and limited distribution of the product. Following the assessment, it was concluded that the carbon footprint of MagTreat®-S is fairly low.

The total cradle to gate product footprint lifecycle emissions for a kg of MagTreat®-S is 488 gCO₂e on the basis of



DAP Antwerpen port. It is important to note that transport accounts for the majority of the total emissions for the product.

According to the assessment, the emissions caused by extraction of the brucite ore (a raw material for MagTreat®-S) are close to zero, accounting for 9 gCO₂e per 1 kg, which indicates that the ore has a very low carbon footprint and it is close to be a carbon neutral raw material.

The advantages of MagTreat® include:

- The most profitable alkali compared with others on the market.
- Suspension with the highest percentage of solids on the market — 65 %.
- Non-toxic, safe for the environment and for handling.
- Non-corrosive.
- Predictably increases pH and alkalinity (buffering effect).
- Reduces COD.
- Reduces odour, fats, oils and grease (FOG), prevents corrosion of water treatment systems.
- Improves dewatering of sludge, reduces its hazard class.
- Precipitates heavy metals and phosphates.
- Use the unique properties of natural magnesium hydroxide to meet your environmental challenges.

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