WATCH WATER®
WATCH WATER
a Water Company

RED-OXY TREATMENT
FILTRATION
ADSORPTION
FILTERSORB
INSTANT PRODUCTS

Clean Polluted Gases

FERROLOX-XG

FERROLOX-XG

Carbon based **Metal-Organic-Frameworks** make excellent Adsorber for Selective sensing and removal of toxic gases.

Removing the troublesome and highly toxic impurities of **Hydrogen Sulfide (H_2S)** and **Carbon dioxide (CO_2)** from gases has become so simple and highly effective using a **Metal (Iron Hydroxide) Organic (Carbon) Framework (MOF)** developed by Watch Water Germany.

Upgrading gases with **FERROLOX-XG** could help the entire world to make greater and cleaner use of gases including natural gas supplies, which can contain high level of toxic impurities. **FERROLOX-XG** can be used to clean natural gases and other industrial gases containing H_2S and CO_2 worldwide to reap potentially large environmental and economic benefits.

"This is about much more than Chemistry"

Removing troublesome impurities from gases

"It's about combining Chemistry, Chemical and Process Engineering, Physics and Computation together."

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TOXIC GAS REMOVAL

Introduction

In introduction you will learn

- All about the major anthropogenic toxic gases and vapours emitted to the atmosphere together with their toxicity levels.
- All about performance of **FERROLOX-XG (MOF)** in environmental remediation process
- All about key features of porous structure and functionality of **FERROLOX-XG** that determine the capturing of Major Atmospheric toxic gases
- All relevance of Catalytically active **FERROLOX-XG** in degradation of **Toxic gases and Vapours** into harmless substance after regeneration with **OXYDES-XG**

The release of anthropogenic toxic **pollutants** into the atmosphere is a worldwide risk of growing concern, which include products of combustion/chemical reaction, leaks of harmful industrial and petrochemical gases and vapours as well as the deliberated emission of chemicals water agent. Common hazardous compounds such as **H_2S, CO_2, CO, NOx, SOx, NH_3,** Nitrogen as hydrogen cyanide or sulfur-containing compounds like Organothiols, hydrocarbons, Volatile Organic Compounds (benzene, toluene, methanol) are of major concern for environmental air pollution. The main sources of toxic gases are anthropogenic gases for example emission of SO_2, NO_2 and CO_2 are mainly due to the burning of fossil fuels that cover the current energy demand.

SOx and NOx are involved in the formation of **photochemical smog** and **acid rain**, which are a major threat to the environment and health.

H_2S is another Poisonous, Corrosive and Odorous gas. It is naturally occurring in Crude oil, Natural gas, Biogas, Waste water systems, Sewage Systems, Landfill leachate and many other sources. The adsorption of these gases prior to their discharge is very important.

Metal Organic Frameworks

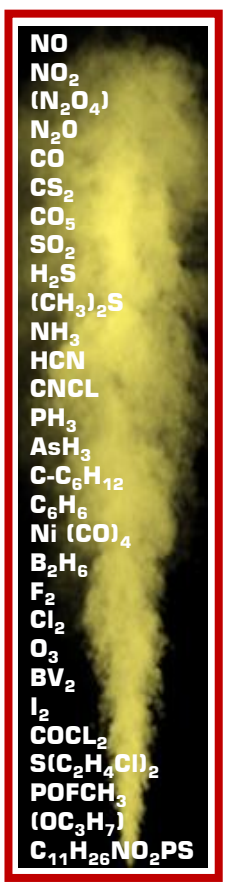
For capturing and degradation of toxic gases and vapours

NH_3 is another contaminant widely used in pharmaceuticals and chemical industries for various applications such as fertilizer, cleaner, fermentation agent, antimicrobial agent, refrigerant, precursor of most N - containing compounds.

Volatile Organic Compounds (VOCs) are also considered as a major group of air pollutants, which potentially lead to photochemical smog, Carcinogenesis, teratogenesis and mutagenesis. VOC are present in **Indoor/Outdoor** air, as a consequence of the emission from chemical process industries, building material, cosmetics, pesticides detergents including Chlorine, Ozone and disinfection by products.

The properties of some of the harmful gases, vapours as well as the concentration levels that are likely to cause severe health effects are listed **in**

Adsorb list →



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ADSORPTION OF TOXIC GASES AND HARMFUL VOC'S

FERROLOX - XG

Watch Water has developed a new Lignin-based porous Organic Polymer (LOP) with BET surface area ranging from **1880 to 2000 m²/gram** synthesized in free-base form via the reaction of meso potassium (hydroxide) to build a rigid building block, hexahydroxy lignin. The granules are then metallated with Iron (III) imparting activity for oxidative cyclization catalysis and Adsorption. Soft microporous Adsorbers, such as **Metal – Organic – Frameworks (MOF's)** are very robust and regenerable. This Reusable Adsorber can reduce both organic and inorganic pollutants. Invention of **Ferrolox-X and XG** relates to water and gas treatment respectively and many other processes for using **Ferrolox-X or XG**, the invention of **FERROLOX-XG** relates to a **Regenerable Adsorber** for the removal of **toxic gases, heavy metals** from water, waste water or gases.

Removal of Hydrogen Sulfide (H_2S)

Conventional Adsorber's or other processes are associated with numerous problems. The weak sulfur retention of these- **Non-Regenerable and Non-Renewable Adsorbers** leads to adverse environmental impact and requires maintenance after their use due to hazardous waste. All conventional Adsorbers are non-regenerable that produce hazardous waste and have proved to be minimum 5 to 6 times more expensive, maintenance even without including exchange costs.

FERROLOX-XG is a adsorber for petroleum and Gas production industry for cost effective process for the removal of almost all gases (on previous list) including hydrogen sulfide from production fluid stream/steams.
FERROLOX-XG for the removal of hydrogen sulfide is not only cost effective through its formation and has ability but very easily renewed by simple regeneration. Invention of **FERROLOX-XG** is to provide high capacity adsorber for the removal of multiple acidic gases.

The fastest growing Class of Adsorber in Chemistry today

The term "fluid" refer to any of the following terms.

- ✓ Oil and Gas
- ✓ Liquids in an Oil well
- ✓ Gases in an Oil well
- ✓ Indoor/Outdoor air
- ✓ All Industrial Application's
- ✓ Sewage water and odour
- ✓ Waste Water and odour

Operating Parameters	
Inlet H_2S Concentration	50 mg/l to 15000 mg/l
Bed height	Min: 0.5 m Max: 12 m
Pressure loss in filter bed	< 1 to 15 mbar depending upon bed height and granule size
Pressure range	No pressure – ca. 25 bar overpressure
Contact time	20 sec – 3 min
Relative gas moisture	Min: 40 % Optimal: 60 % - 80 %

Note: A partially regenerated mass of granules containing sulfur, may ignite when comes in contact with oxygen. Sulfur ignites in in air at temperature ranging between 190 °C and 260 °C.

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REGENERATION OF FERROLOX-XG

OXYDES-XG

Oxygen-Based-Regeneration of FERROLOX-XG

All toxic gases and Volatile Organic Compounds adsorbed by **FERROLOX-XG** will be released in the presence of Oxygen, Therefore delivery of Oxygen is a key to good regeneration; however, the common and useless practice of bubbling Air does not regenerate because the surfaces get serious biofouling.

Watch Water has developed a **novel solid oxygen** to efficiently regenerate **FERROLOX-XG** Adsorber. '**OXYDES-XG**' the Oxygen based granular can deliver huge amount of **Oxygen** without bubbling and will clean and disinfect Adsorber surface. Oxygen will balance of toxic gases and toxic organics to harmless compounds. The **OXYDES – XG** developed and manufactured by **Watch Water** Germany has put solid foundation to regenerate Adsorber based on **Green-Chemistry-foundations**. In the **FERROLOX-XG**, Oxygen is delivered by diffusion to toxic compounds accumulated on the outer surface of Adsorber, there by eliminating the disposal problem of Non-Regenerable adsorber loaded with toxicity. Thus **OXYDES-XG** should sustain Toxic and Volatile gas degradation even at the high toxic concentrations found in VOC's- bearing Air from Wastewater, Petrochemical, Gas or Industrial facilities.

Watch Water have developed a Modified-Metal-Organic-Frameworks for assessing the importance of Oxygen-Based-Regeneration of toxic Adsorbers at contamination sites. The framework has the potential to help environmental – Cleanup professionals and regulations, which developed as a more cost-effective and environmentally responsible remediation plans.

"OXYDES-XG has More Oxygen Than You Think"

For more information please check our brochure **OXYDES-XG**

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