

## Coatings against Bio Corrosion:

# MIC – Microbially induced corrosion – fast and fatal

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Extreme concrete erosions...



Anaerobic biocorrosion (MIC) causes much trouble in different sectors of industry. The anaerobic microorganisms provoke a 10-times higher corrosion rate by the release of specific enzymes (mainly "hydrogenase"). Moreover, the bacteria produce toxic hydrogen sulfide.



Pitting corrosion...

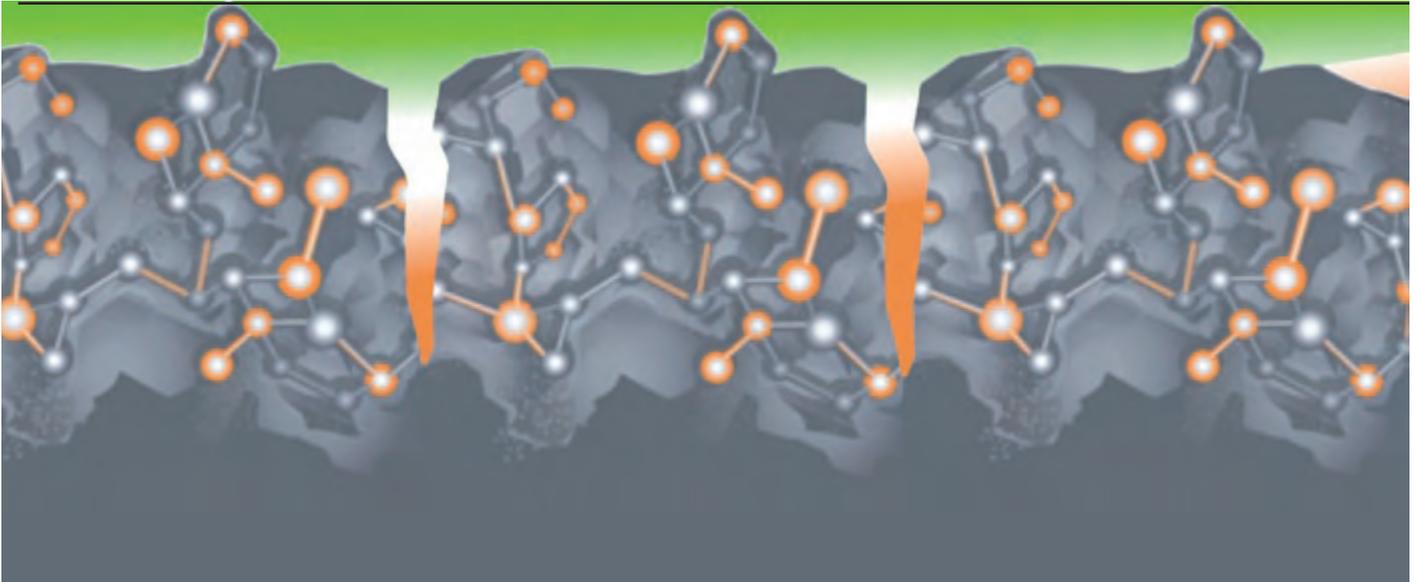
Only in Germany, MIC leads to losses in the amount of double-digit billions and to environmental damages of inestimable dimensions; 20% of all costs caused by corrosion are based on microbial destruction of the material.

Mainly responsible for the anaerobic corrosion are sulfate reducing bacteria (SRB). These microorganisms accelerate corrosion in tanks and other technical installations, which come in contact with water and organic materials. Such surfaces have to be cleaned continuously; otherwise, gel-like biofilms form due to the rapid propagation of SRB bacteria. This process causes biofouling with a strong smell and slime formation which could be a precursor of biocorrosion.



...advanced bio corrosion induced by microbial metabolic products.

Since years, various conferences, studies and examinations regarding this matter are conducted. Also many publications are released. The complex of problems is clearly identified and scientifically proven. But so far no long-run concept for the prevention of biocorrosion was generated. The removal of biofilm and biofouling, the killing of the bacteria with disinfectants or elimination of their life sources are not durably effective.



## Unique long-term protection against biocorrosion induced by SRB-bacteria!

### Development and patent application by Ceramic Polymer GmbH!

An important part of our company philosophy is the new development of coating products for special demands. Through extensive and continuous research work, we are constantly improving the quality and the range of our product portfolio. Therefore we also provide adequate coating solutions for specific niche markets.

One of our multiannual research projects has been successfully completed. As the single manufacturer, Ceramic Polymer features internal coatings for biogas plants and storage tanks for crude oil and all kinds of hydrocarbons against anaerobic biocorrosion induced by SRB bacteria.

### Performances and properties of the new anti-SRB-coating systems

**Special biocides in nano-crystalline shape** are integrated by a patent pending method in a specific-micro-filled polymer matrix.

#### Unique functionality

Due to temperature gradients or mechanical impact, cracks in the range of nano- or micrometers occur in every(!) coating during operation time. The SRB bacteria settle down primarily in those cracks, which appear as protective niches with low circulation.

As soon as micro cracks occur in the coating, the special biocide crystals burst and unfold their effect within the whole crack. The SRB

are killed before they can settle. The existing depot effect causes a long-lasting biocidal corrosion protection without localized erosion.

No negative impacts occur to the necessary bacterial processes in biogas fermenters, because the biocidal effects are restricted locally to the micro cracks in the coating.

#### Safe application

During the application procedure and also after curing, the biocidal active component remains at first tightly encapsulated in the polymer matrix, so that the coated surface is not antiseptically active and therefore physiologically harmless. The kind of biocide employed is virtually harmless for humans. The application of these effective coating systems can easily be conducted by airless spraying method or roll and rake.

#### Constant durability

Extensive test series by our independent research partner have proven clearly that biocorrosion induced by SRB-bacteria can be largely prevented by using our special coating products. Therefore, effective and targeted protection of concrete and steel substrates for biogas plants and tanks for crude oil and hydrocarbons is permanently achieved.

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**Do you have any questions concerning our special coatings?**

**Our corrosion experts will gladly assist you.**