

Coatings against biocorrosion:

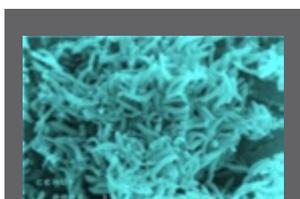
New Development! Unique long-term protection against bio corrosion !

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Ceramic Polymer GmbH together with cooperating independent institutes have developed highly resistant internal coatings by extensive research with a long-term protection for tanks which store crude oil as well as all kinds of hydrocarbons against microbe induced bio corrosion and has applied for the patent.

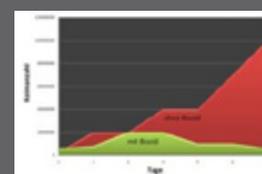
The anaerobe corrosion occurring under exclusion of air/oxygen is caused by sulfate reducing bacteria (SRB). These bacteria form biofilms at the bottom of the filled tank, which spread rapidly and destroy the surface by accumulation of inter-bacterial depletion products.

An internal coating of the tank protects temporarily against the impact of the biofilm. But cracks in the range of nano- or micrometers due to deterioration occur in every coating by physical stress effects as a result of temperature gradients or mechanical impact and can no longer withstand the attack of the SRB.

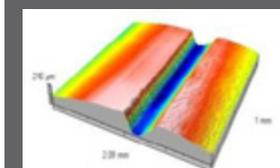


Biofilm of anaerobic bacteria
(electron microscopical photo)

The bacteria permeate into these microcracks until they reach the substrate. The so-called bio corrosion features a ten times higher oxydation rate compared to conventional corrosion and is generated by the bacteria's metabolism (hydrogen sulfide, sulfuric acid and nitric acid). Rust tubercles and resulting rapidly progressive pitting corrosion is the consequence.

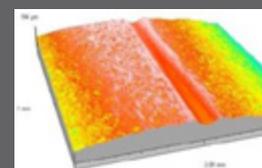


Bacterial growth by using Ceramic-Polymer-Coating containing biocide (green curve)



Coating without biocide
Microcrack shows strong broadenings and cavities close to the substrate caused by SRB. Substrate is at risk by bio corrosion. (electron microscopical test photo of an independent institute)

The phenomenon "biogenic pitting corrosion" which firstly looks like normal rust, leads to a shorter durability of tanks with a loss of energy and down times until total breakdown. According to experts 20 % of all costs caused by corrosion are based on microbial destruction of the material.



Coating integrating a broad-band-biocide (patented)
Microcrack is protected by the effect of the biocide. There is no cavity reaching the substrate. (electron microscopical test photo of an independent institute)

By long-lasting R & D analysis we developed a production process for protective coatings by combining a broad-band-biocide of nano-crystalline structure with ceramic fillings in a polymer matrix. After applying our internal coating for tanks, the biocidal active component remains at first tightly encapsulated in the polymer matrix, so that the coated surface is not antibacterially active and therefore physiologically harmless.



Coating without biocide
After a month-long test the cleaned test rod already shows deepened biocorrosion in the microcrack. (depth of crack 150-200 µm, test photo of an independent institute)

Because of already mentioned effects (aging, stress effects due to temperature, mechanical impact) microcracks may occur in the coating extending over several years. Now, when the local surface is forced open, the biocide crystals are exposed in the crack and unfold their effect along the surface inside of the entire microcrack.



Coating integrating a broad-band-biocide (patented)
After a month-long test the cleaned test rod shows clearly lower depth of the microcrack due to the effect of the biocide. (depth of crack 50-80 µm, test photo of an independent institute)

The existing depot-effect causes a long-lasting biocidal corrosion protection against anaerobic strains of bacteria in the microcracks.

Thereby pitting corrosion is well-targeted avoided on a long-term basis.

Further product advantages
Ceramic-Polymer-Coating with broad-band-biocide

- surface physio- and ecotoxicologically harmless
- long term, highly effective microcrack protection = pitting corrosion prevention