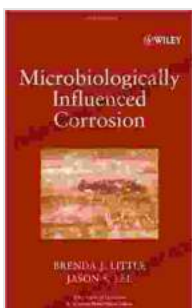


# Microbiologically Influenced Corrosion: A Comprehensive Guide

Microbiologically influenced corrosion (MIC) is a major problem in many industries, including oil and gas, water treatment, and manufacturing. MIC is caused by the activity of microorganisms, such as bacteria and fungi, which can form biofilms on metal surfaces. These biofilms can create a favorable environment for corrosion, leading to the degradation of metal components.

The cost of MIC can be significant. In the oil and gas industry, for example, MIC can cause billions of dollars in damage each year. In the water treatment industry, MIC can lead to the contamination of drinking water supplies. And in the manufacturing industry, MIC can cause the failure of critical equipment.

MIC is caused by the activity of microorganisms, which can form biofilms on metal surfaces. Biofilms are complex communities of microorganisms that are attached to a surface and surrounded by a matrix of extracellular polymeric substances (EPS). EPS is a sticky substance that helps to protect the biofilm from environmental stresses.



## Microbiologically Influenced Corrosion (Wiley Series in Corrosion Book 7) by Germán N. Gallardo Aparicio

★★★★☆ 4.7 out of 5

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The microorganisms that cause MIC can be found in a variety of environments, including soil, water, and air. They can also be found on the surfaces of plants and animals.

MIC can occur through a variety of mechanisms. The most common mechanism is through the production of acids by microorganisms. These acids can dissolve the protective oxide layer on metal surfaces, making them more susceptible to corrosion.

Other mechanisms of MIC include:

- **Direct attack:** Microorganisms can directly attack metal surfaces, causing pitting and other forms of corrosion.
- **Indirect attack:** Microorganisms can produce metabolites that are corrosive to metal surfaces.
- **Biofilm formation:** Biofilms can create a favorable environment for corrosion by providing a protected environment for microorganisms and by creating a barrier between the metal surface and the surrounding environment.

There are a number of strategies that can be used to prevent MIC. These strategies include:

- **Controlling the environment:** MIC can be prevented by controlling the environment in which metal surfaces are exposed. This includes controlling the temperature, humidity, and pH of the environment.

- **Using corrosion-resistant materials:** MIC can be prevented by using corrosion-resistant materials. These materials include stainless steel, nickel alloys, and titanium.
- **Applying protective coatings:** MIC can be prevented by applying protective coatings to metal surfaces. These coatings can include paints, sealants, and cathodic protection systems.
- **Biocides:** MIC can be prevented by using biocides. Biocides are chemicals that kill or inhibit the growth of microorganisms.

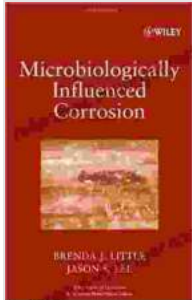
MIC is a major problem in many industries. However, it can be prevented by using a combination of strategies. These strategies include controlling the environment, using corrosion-resistant materials, applying protective coatings, and using biocides.

By following these strategies, it is possible to prevent MIC and protect metal components from corrosion.

### **Alt attribute for images:**

- **Image of a biofilm on a metal surface:** A biofilm is a complex community of microorganisms that are attached to a surface and surrounded by a matrix of extracellular polymeric substances (EPS). EPS is a sticky substance that helps to protect the biofilm from environmental stresses.
- **Image of a corroded metal surface:** Corrosion is the degradation of metal surfaces due to chemical or electrochemical reactions. MIC is a type of corrosion that is caused by the activity of microorganisms.

- **Image of a worker applying a protective coating to a metal surface:** Protective coatings can help to prevent MIC by creating a barrier between the metal surface and the surrounding environment.



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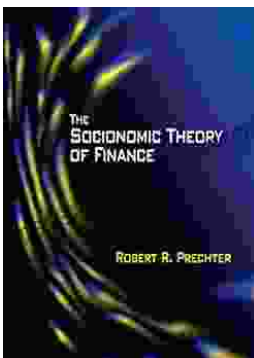
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