**Uniform corrosion**

This corrosion form is also referred to as **general corrosion**, it results from a chemical attack that **proceeds at a similar rate over the entire surface**. Typically the atmospheric exposure of iron metals (if not specifically corrosion resistant alloys) leads to the formation of red rust (see corresponding picture). Metals like stainless steel or aluminium can oxidise and form a protective oxide layer that hinders the progression of the corrosion reaction.

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**Galvanic corrosion**

At least two **dissimilar metals or alloys** must be **electronically** connected in general electrolyte. In this case the metal that oxidises in favour of the more cathodic one is lower on the galvanic series. The mode of action is analogous to a battery cell. Thus, the higher the current that flows in the system the severer the corrosion. This form of corrosion is very common in water pipes where tubings of steel and copper or copper containing alloy are joined.

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**Crevice corrosion**

This form of corrosion occurs **within crevices and other shielded areas** on metallic surfaces that are exposed to a corrosive environment. Typically, crevices can develop a **local chemistry** that is different from that of the bulk fluid, especially when stagnant solutions can remain in this crevices. The contact area of metallic and non-metallic surfaces may be attacked by this form of corrosion.
Pitting

Holes in the metal are the result of an extremely localised attack preferentially in areas with small surface defects like holes or scratches, since corrosive media tend to gather in this areas. It is one of the most destructive and insidious forms of corrosion, since it is often difficult to detect the pits due to their small size and the fact that they are often covered with corrosion products. Therefore, failures often occur with extreme suddenness.

Intergranular corrosion

This form of corrosion results from the localised attack at and adjacent to grain boundaries with relative little corrosion of the grains. Materials with precipitated phases or impurities at the grain boundaries can be more susceptible to this form of corrosion. As a result the alloy disintegrates due to grains falling out.

Selective leaching

This corrosion process is characterised by the removal of one element from a solid alloy e.g., Zn, Al, Fe, Co or Cr. Depending on the eliminated element one speaks of dezincification, dealumini-fication, etc.. Thus, this form of corrosion is also referred to as dealloying. During graphitisation of grey cast iron the graphite network is left intact while the iron matrix is attacked by the environment (see corresponding picture).

Erosion corrosion

In this form of corrosion because of relative movements between the corrosive fluid and the metallic surface the rate of the metal deterioration is increased. The corrosion manifests as grooves, waves, rounded holes, etc. exhibiting usually a directional pattern. In passive alloys the mechanical abrasion wears off the protective layer that inhibits corrosion.
Stress corrosion cracking (SCC)

The simultaneous presence of tensile stress and a specific corrosive medium (e.g., aluminium alloy the presence of chlorides) is responsible for this form of corrosion. The metal or alloy is virtually unattacked over most of its surface, while fine cracks progress through it. Stress-corrosion cracks give typically the appearance of a brittle mechanical fracture. The cracking proceeds generally perpendicular to the applied stress.

Hydrogen damage (bilistering)

This form of corrosion is a general term which applies to mechanical damage of metal caused by the presence of, or interaction with hydrogen. It can be divided into 4 types according to the failure appearance:
- Hydrogen blistering (see picture)
- Hydrogen embrittlement
- Decarburisation (removal of carbon)
- Hydrogen attack (T>200 °C)

Microbiologically influenced corrosion

This form of corrosion deteriorates metals as a result of the metabolic activity of several microorganisms (e.g., algae, bacteria (SRB),...) using constituents as energy source. It is closely associated with the phenomenon of biofouling.
(water or soils, at pH 4-9, temperature 0-50 °C, aerobic or anaerobic environment)
The picture shows large MIC nodules in a wet fire sprinkler system.

Environmental stress cracking (ESC)

The premature initiation of cracking of a plastic due to the simultaneous action of stress and strain and contact with specific chemical environments causes unexpected brittle failure of thermoplastic (especially amorphous) polymers. The source of stress is often that which is unavoidably processed in during moulding and therefore, applied stress is not a prerequisite.
The underlying principle is different from typical corrosion processes occurring in metals (≠SCC).