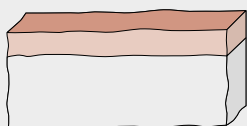


Corrosion

Corrosion refers to the reaction of a metallic material to its environment, which causes a measurable change in the material. This can lead to impairment of the function of a metal component or a whole system.

The form of the material changes due to corrosion

Surface erosion, uniform erosion of the workpiece surface



Pitting corrosion, crater-shaped or pinhole-like depressions that undermine the surface

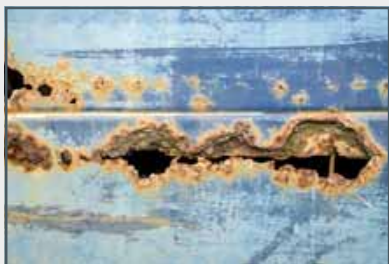
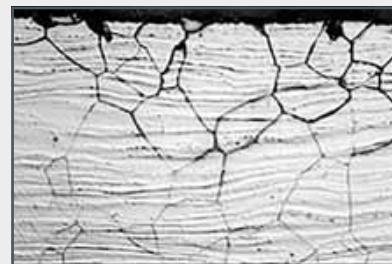
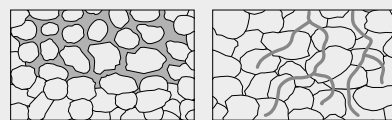


Figure left and below: intergranular corrosion along the grain boundaries.

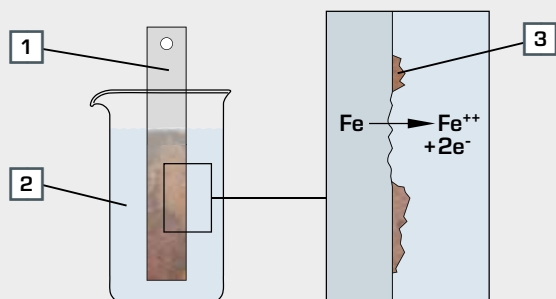
Figure right: transgranular corrosion, transverse through the grains



Processes during corrosion

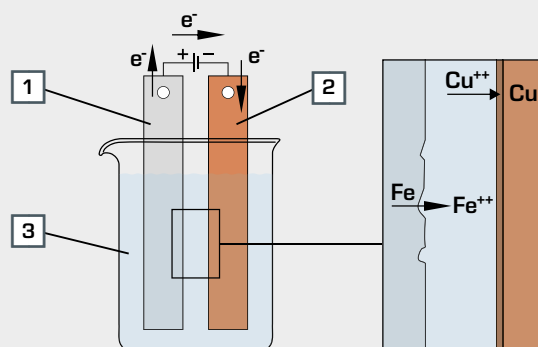
The environmental conditions of the material are significant for corrosion. Essentially, these are gases from the surrounding atmosphere and liquids. Solutions can be electrolytes

(ion-conducting liquids). In metals, corrosion is caused primarily by electrochemical or chemical processes.



Oxygen corrosion: a direct electron exchange takes place between iron and oxygen-enriched water. The iron bonds with the oxygen to form iron oxide.

1 electrode (iron Fe), 2 electrolyte enriched with oxygen (water), 3 iron oxide, Fe^{++} iron ion, e^- free electron



Electrochemical corrosion occurs through the formation of galvanic elements. If two different metals come into contact, an electrical current flows in the presence of an electrolyte. This dissolves base metal. More or less current flows depending on the metals present, and destruction takes place.

1 anode (iron Fe), 2 cathode (copper Cu), 3 electrolyte (copper sulphate $CuSO_4$), Cu^{++} copper ions, e^- electron, Fe^{++} iron ion