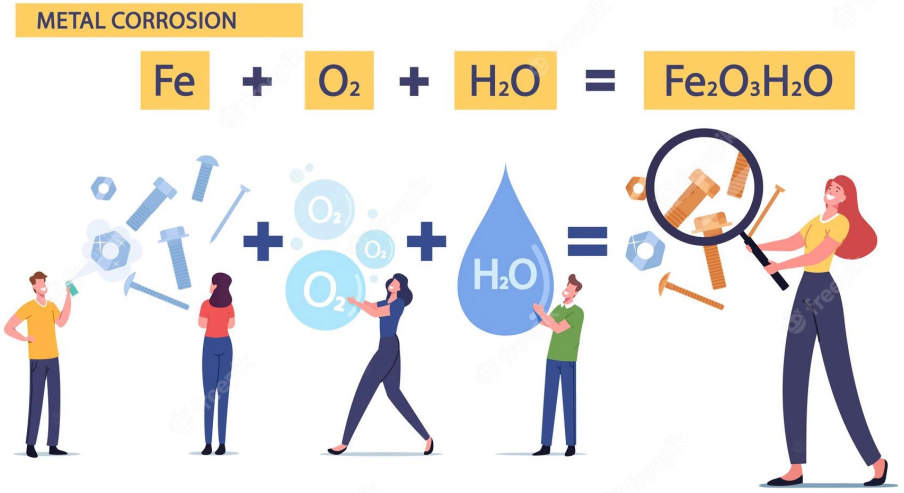
Corrosion Products



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Corrosion Products

Corrosion product is any substance which is formed as a result of corrosion. Corrosion products known as rust for iron and steel are formed and gradually grown on the surface of common steel and low-alloyed steel when they are exposed to humid air at room temperature.

Corrosion Products of Fe

Corrosion Products	Color	Remarks
Fe	Silvery-gray	
α-FeOOH	Yellow/dark brown/red	Geothite
β-FeOOH	Yellow/dark brown/red	Akageneite
γ-FeOOH	Yellow/dark brown/red	Lepidocrocite
δ-FeOOH	Yellow/dark brown/red	Feroxyhite
$Fe(OH)_2$	Yellow/Blue/green	
FeO	Black	
$Fe_2O_3.H_2O$ or $Fe(OH)_3$	Red-brown rust	
$Fe_3O_4.H_2O$ or $Fe_2O_3.FeO$	Green/deep blue	
Fe_3O_4	Black	Magnetite
α-Fe_2O_3	Red	Hematite
γ-Fe_2O_3	Reddish-brown	Maghemite

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Corrosion Products of Zn

Corrosion Products	Color	Remarks
Zn		
ZnO	White	Zincite
$Zn(OH)_2$	White	
$ZnCO_3$	White	Smithsonite
$Zn_5(CO_3)_2(OH)_6$	White	Hydrozincite
$4ZnO.CO_2.4H_2O$	White	Hydrated zinc
$Zn_4CO_3(OH)_6.\ H_2O$	White	Basic zinc
$ZnCO_3.3Zn(OH)_2.\ H_2O$	White	Basic zinc
$Zn_5(OH)_8\ Cl_2.\ H_2O$	White	Simonkolleite

Corrosion Products of Cu

Corrosion Products	Color	Remarks
CuO	Green/Black	
Cu_2O	Red	
$CuCO_3$	Green	
$Cu(OH)_2$	Pale greenish blue or bluish green	
CuOH	Yellow or orange-yellow	

Corrosion Products of Al

Corrosion Products	Color	Remarks
Al	Silver white	
Al_2O_3	Dull gray to powdery white	
$Al(OH)_3$	White	
$Al_2(SO_4)_3$	White	
$AlCl_3$	White	

Corrosion Products of Cr

Corrosion Products	Color	Remarks
Cr	Silver gray	
Cr_2O_3	Green	
$Cr_2(SO_4)_3.XH_2O$	Green/Purple	
$CrCl_3$	Blue/Green	
$[Cr((OH)_2)_6]^{3+}$	Red-violet	

Weathering Steel

Weathering steel, often referred to by the genericized trademark COR-TEN steel and sometimes written without the hyphen as corten steel, is a group of steel alloys which were developed to eliminate the need for painting, and form a stable rust-like appearance after several years' exposure to weather.

Composition of Weathering Steel

Weathering steels have a carbon content below 0.2 wt%. They are enriched with alloying elements such as Al, Cu, Ni, Cr, Si, P, and Mn, which collectively contribute to a total content ranging from 1.00 wt% to 5.00 wt%.

Weathering steel is a family of low carbon alloy steels that consists of a variety of grades. Some grades are proprietary, such as COR-TEN A or COR-TEN B. The Patinax weathering steels are another group of proprietary grades. All of these proprietary grades are similar to the ASTM classifications A 242 and A 588.

Mechanism of Weathering Steel

Weathering steel, when exposed outdoors for a few years, forms a protective layer resulting in reduction of the corrosion rate. The state of rusts is fundamental for understanding its mechanism.

CORROSION ENGINEERING

Thank you for kind attention

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