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CLASSIFICATION OF CORROSION PROCESSES

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A B S T R A C T

In the chemical industry, the corrosion process occurring in technological devices is one of the urgent problems. Because corrosion causes great economic damage due to the rapid failure of metal products, equipment, structures and devices. This scientific article presents the classification of the corrosion process according to various symptoms.

K E Y W O R D S

Chemical corrosion, gas corrosion, electrochemical corrosion, local corrosion, subsurface corrosion, pitting corrosion, cavitation corrosion.

INTRODUCTION

The current rate of development of production and techniques and technologies places high demands on the durability, strength and corrosion resistance of construction materials.[1]

All devices made of metals and alloys corrode during operation in various environments.

Corrosion processes are classified according to the following symptoms:

* on the mechanism of exposure of metals to the external environment
* according to the types of corrosion environment and the conditions of the process
* according to the character of corrosion decay
* on other types of additional effects that affect the metal together with the corrosive environment. [2-3]

According to the mechanism of the corrosion process, there is chemical and electrochemical corrosion of metals in nature.

Chemical corrosion is the process of interaction of metal with the external environment in which the oxidation of metals and the reduction of the oxidizing component of the environment occur at the same time and in one act.

Electrochemical corrosion is a process of interaction of a metal with a corrosive environment

(electrolyte solution), in which the ionization of metal atoms and the reduction of the oxidizing component of the corrosive environment take place in different acts, and their speed depends on the electrode potential. [4-5]

According to the type of corrosion environment and the conditions of the corrosion process, corrosion is divided into several types:

Gas corrosion is chemical corrosion of metals in a gas environment with minimal moisture (usually no more than 0.1%) or high temperature.

This type of corrosion is most common in the chemical and petrochemical industry. Gas corrosion occurs in the oxidation stage of sulfur dioxide in the production of sulfuric acid, during the synthesis of ammonia, in the production of nitric acid and hydrogen chloride, in the production of organic alcohols and oil cracking, and in other processes.

Atmospheric corrosion is the corrosion of metals that occurs in an air atmosphere or any moist gas environment.

Underground corrosion - corrosion of metals in the underground and soil environment. [6-7]

Biocorrosion is corrosion caused by the activity of various microorganisms.

Contact corrosion is a type of corrosion that occurs due to the contact of metals with different stationary potentials in a given electrolyte.

Radiation corrosion is corrosion caused by radioactive radiation.

Corrosion under the influence of external current - corrosion caused by an external current source.

Corrosion of alternating currents is corrosion caused by alternating currents.

Corrosion under tension - corrosion caused by the simultaneous effect of corrosive environment and mechanical stresses. If the stress is tensile, it can cause the metal to crack. This type of corrosion is especially dangerous for metal structures under the influence of mechanical stresses.

If metal objects are subjected to cyclic tensile stress that is repeated periodically, they will undergo corrosion fatigue. This leads to a decrease in the metal fatigue limit. Such corrosion often occurs in car springs, wings, shafts of rolling mills, crankshaft mechanisms, vibration machines, etc. [8-9]

Cavitation corrosion is the destruction of metal due to simultaneous corrosive and percussive effects of the external environment.

Fretting corrosion is the corrosion of metal due to simultaneous corrosive and vibration effects of the external environment.

Corrosion caused by friction or vibration can be reduced by proper selection of construction materials, reduction of friction coefficient, coating, etc. According to the nature of changes occurring on the surface of metals and alloys, corrosion corrosion is divided into several types (Figure 1).

Corrosion is called complete if it occupies the entire surface of the metal (Fig. 1, a and b). Comprehensive corrosion is called uniform if the process occurs in the same plane over the entire surface of the metal (Fig. 1, a), and it is called non-uniform if the speed of the process is different at different points of the metal surface (Fig. 1, b). Flat corrosion can be observed on the surface of iron pipes that have been exposed to air for a long time.

In selective corrosion (Fig. 1, c), one structural constituent or bit component of the alloy is eroded. An example of such corrosion is graphitization of cast iron or dezincification of copper (brass).

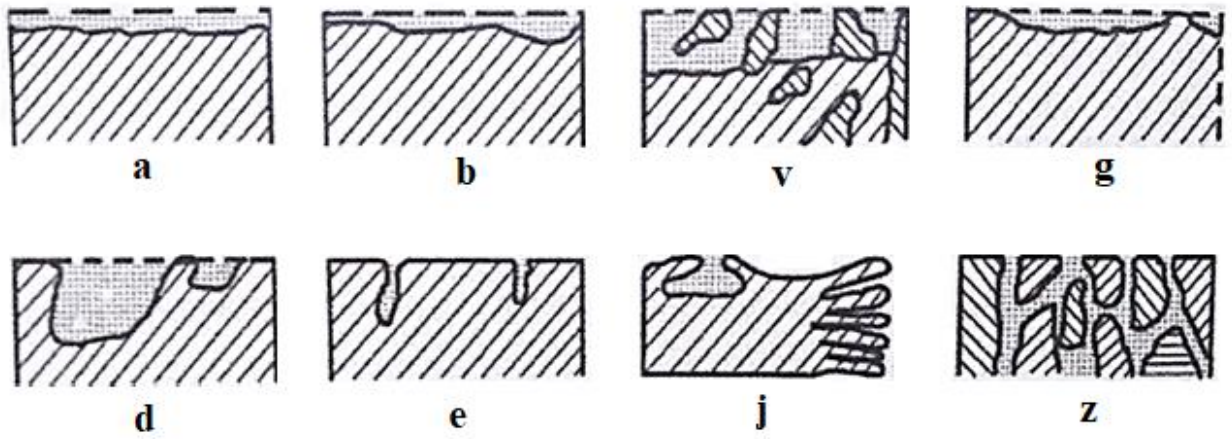

Figure 1. Corrosion phenomena occurring on the surface of metals and alloys

a-completely flat; b-completely uneven; v-selected-structural; g-spotted; d-wounded; e-point (pitting); j-subsurface; z-intercrystal

Local corrosion covers individual areas of the metal surface (Fig. 1, g, d, e). Local corrosion is isolated spots that do not go deep into the metal (Fig. 1, g), decay-wounds in the form of shells deeply sunk into the metal (Fig. 1, d), or points (pittings) that go deep into the metal (It can be in the form of Fig. 1, e). The first appearance is formed, for example, in brass left in sea water. Corrosion in the form of ulcers is observed in steel located in soil, and pitting in chromium-nickel austenite steels in seawater. [10]

Subsurface corrosion (Fig. 1, j) begins on the surface of the metal and then spreads deeper inside it. Corrosion products accumulate in metal cavities. This type of corrosion causes metal objects to bulge and separate into layers. [11]

Intercrystalline corrosion is characterized by erosion along the boundaries of metal grains (Fig. 1, z). In this case, unbearable corrosion products are formed between the metal grains.

SUMMARY

Among the different types of corrosion, intercrystalline corrosion is dangerous because the appearance of the metal does not change, but it loses its strength and elasticity, and becomes brittle. As a result, the deceptive "health" of the surface of metals and alloys can lead to incorrect conclusions about the strength of devices and structures, as well as accidents or catastrophes. Chrome and chrome-nickel steels, nickel and aluminum alloys are subject to such corrosion.

Crevice corrosion corrodes parts in metal slots, under pads, threaded joints, and other similar places. As a result of corrosion, the properties of the metal change, and often its functional characteristics deteriorate. When metals and their alloys are corroded, they are partially or completely destroyed. All types of corrosion occurring in devices and metal structures require drastic measures.

REFERENCES

1.Olimov B. B., Akhmedov V. N., Gafurova G. A. Application of derivatives of diatomic phenols as corrosion inhibitors //Euro Asian Conference on Analytical Research (Germany. – 2021. – T. 15. – C. 136-138.

2.Жумаев Ж.Х., Ахмедов В., Шарипова Н.У. ВЛИЯНИЕ ПРИРОДЫ И КОЛИЧЕСТВА КАТАЛИЗАТОРА ПРИ СИНТЕЗЕ МОРФОЛИНОВЫХ НЕНАСЫЩЕННЫХ ПРОДУКТОВ ПРИ УЧАСТИИ ВИНИЛАЦЕТИЛЕНА //
Москва. – 2021. – С. 58-61..
3.Zuhriddin, R., & Niginabonu, J. (2022). PRODUCTION OF POLYETHYLENE TEREPHTHALATE. Universum: технические науки, (5-11 (98)), 58-62.
4.Садирова, С. Н., Темирова, М. И., & Алиева, Н. И. (2020). Исследование проквашенности каракуля с применением вторичных продуктов молочного производства. International Journal of Advanced Technology and Natural Sciences, 1(1), 39-44.
5.O'G'Li, R. Z. K., & Qizi, J. N. Q. (2022). ANALYSIS OF IMPORTANCE AND METHODS OF PRODUCTION OF BLOCK SOPOLYMERS BASED ON POLYETYLENTEREPHTALATE. International Journal of Advanced Technology and Natural Sciences, 3(1), 51-55.
6.Ниёзова, Раъно Нажмиддиновна. "Экологические и эксплуатационные свойства жированных кож на основе синтетических жирных кислот." Science and Education 2.12 (2021): 347-352.
7.Zuhriddin, R., Niginabonu, J., Aminjon, V., & Temurbek, D. (2022). MECHANISMS OF ETERIFICATION OF TEREFTALIC ACID WITH ETYLENGLYCOL. Universum: технические науки, (5-11 (98)), 63-67.
8.V.N.Axmedov, Z.X.Rayimov, G.A.G'afurova.Tereftal kislota hosilalari. ISBN 978-9943-9265-3-0 Monografiya "Durdona" nashriyoti. 2023. 152 bet.
9.Райимов, З. Х. У., & Усмонов, С. Б. (2023). Синтез ароматических полиэфирсульфонкетонов на основе олигосульфонкетона различного состава и строения. Science and Education, 4(4), 495-502.
10. Olimov B., Akhmedov V., Gafurova G. Production and use of corrosion inhibitors on the basis of two-atomic phenols and local raw materials //environment. – Т. 7. – С. 11.
11.Паноев Э. Р., Дустов Х. Б., Ахмедов В. Н. Проблемы коррозии в кислых компонентных системах и способы ее уменьшения //Universum: технические науки. – 2021. – №. 12-5 (93). – С. 47-50.