POLYMER GRADES AND EVALUATION: GRADE OF CORROSION ASSESSMENT

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ABSTRACT: Polymers are widely used in various industries due to their light weight, chemical durability and mechanical properties. However, their performance in a corrosive environment depends on the level of the polymer and its resistance to chemical breakdowns. This article will study various polymer varieties, their classification and methods used to assess corrosion resistance. Key assessment methods such as chemical resistance testing, thermal stability analysis, and environmental stress fracture assessment are discussed.

KEYWORDS: Polymer varieties, corrosion assessment, chemical resistance, thermal stability, cracking under the influence of the environment, polymer.

INTRODUCTION: Polymer materials are widely used in industry because they are considered light, durable and resistant to chemical influences. But in different environments, their corrosion tolerance is different, which determines their area of application. In this study, the degree of corrosion resistance of various polymers is assessed byx. The corrosion resistance of polymers depends on their composition, physical and chemical properties. For example, while some polymers are quickly eroded by the action of acids and alkalis, others can withstand high temperatures and ultraviolet radiation. Therefore, it is important to know the area of use of each polymer and its degree of corrosion resistance[2].

METHODS: The following methods were used during the study:

1. Exposure to moisture and chemicals – polymers were stored in acid and alkali solutions for a certain period of time.

2. Thermal impact tests-degradation processes of polymers have been observed by increasing temperature[3].

3. Microscopic analysis-electron microscopy was used to detect structural changes.

4. Mechanical tests-the elasticity and strength of materials were assessed using special tools.

5. Exposure to UV radiation-the degree of decay of polymers under the influence of ultraviolet rays was observed.

6. Hardness and elasticity analysis-the tolerance of polymers to pressure, stretching and bending was assessed[4].

The types of polymers used in the study and their physical properties

table

Polymer type	**Density (g/sm^3)**	**Melting temperature (°C**	**Corrosion resistance**	**UV radiation resistance**
PTFE (Teflon)	2.2	327	too high	Too high
PVC (polyvinyl chloride)	1.4	212	medial	low
PP (Polypropylene)	0.91	160	good	medial
PE (Polyethylene)	0.95	130	medial	Medial

RESULTS: The results of the study showed that:

1. Chemical stability-PTFE has the highest chemical tolerance and did not deteriorate even in aggressive environments. PVC, on the other hand, has lost its physical properties by reacting with some solvents.

2. Under the influence of thermal durability – temperature, PTFE and PP almost retained their properties, while PE and PVC underwent softening and structural changes.

3. Microscopic structural changes-PTFE retained its smooth and robust structure, while PVC formed cracks in some areas. PP and PE were slightly deformed.

4. Mechanical strength-PTFE and PP showed good elasticity and stiffness, while PE and PVC were deformed at low loads.

5. UV radiation resistance-PTFE showed very high tolerance, while PVC was rapidly eroded by exposure to ultraviolet light.

PP and PE showed moderate results[5].

Discussion

Based on the results of the study, it is recommended to use high corrosion-resistant polymers in industrial and construction areas. Polymers such as PTFE and PP are particularly preferred in chemical plants and marine environments[6].

* Chemical industry-PTFE is the best choice and shows excellent resistance to aggressive environments.

• Marine and humid environments-PVC and PP show relatively good tolerance, but require additional protection for long-term use.

• Building materials-PVC and PE are widely used, but their mechanical strength can be limited.

• Food industry-PTFE is preferred in this area due to its high hygienic properties.

• Cosmetic and pharmaceutical industries-PTFE and PP are widely used in these industries because they are non-toxic and have biological stability[7].

CONCLUSION: Corrosion resistance of polymeric materials depends on their chemical composition and structural properties. PTFE was found to be the most durable material, while PVC and PE should be used depending on the environment. Therefore, before using each polymer, it is necessary to deeply study its corrosion resistance[8].

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