

Моя профессиональная
карьера

ISSN

INTERNATIONAL
STANDARD
SERIAL
NUMBER

ISSN

2782-4365

Проверить
номер:



Научно-образовательный электронный журнал

ОБРАЗОВАНИЕ И НАУКА В XXI ВЕКЕ

Выпуск №70-2 (том 2)
(январь, 2026)



Google
Scholar



Периодичность выпуска: 1 раз в неделю

Сайт: mpcareer.ru/oinv21veke. Почта: obrmprcareer@mail.ru



Международный научно-образовательный
электронный журнал
«ОБРАЗОВАНИЕ И НАУКА В XXI ВЕКЕ»

ISSN 2782-4365

УДК 37

ББК 94

**Международный научно-образовательный электронный журнал
«ОБРАЗОВАНИЕ И НАУКА В XXI ВЕКЕ». Выпуск №70-2 (том 2) (январь,
2026). Дата выхода в свет: 12.01.2026.**

Журнал объединяет авторов на территории стран СНГ и помогает обмениваться передовыми научно-образовательными исследованиями.

Содержит научные статьи отечественных и зарубежных авторов по экономическим, техническим, философским, юридическим и другим наукам.

Миссия научно-образовательного электронного журнала «ОБРАЗОВАНИЕ И НАУКА В XXI ВЕКЕ» состоит в поддержке интереса читателей к оригинальным исследованиям и инновационным подходам в различных тематических направлениях, которые способствуют распространению лучшей отечественной и зарубежной практики в интернет пространстве.

Целевая аудитория журнала охватывает работников сферы науки и образования (педагоги, учителя, ученые, преподаватели, научные сотрудники, бакалавры, магистранты, аспиранты).

Материалы публикуются в авторской редакции. За соблюдение законов об интеллектуальной собственности и за содержание статей ответственность несут авторы статей. Мнение редакции может не совпадать с мнением авторов статей. При использовании и заимствовании материалов ссылка на издание обязательна.

© ООО «МОЯ ПРОФЕССИОНАЛЬНАЯ КАРЬЕРА»

© Коллектив авторов

Gulnaza Matkarimova, Sheker Atageldiyeva, Mustafayev Rahmanmyrat PRODUCTION TECHNOLOGY OF CERAMIC NANOCOMPOSITES BASED ON ALUMINUM OXIDE (AL ₂ O ₃)	185
Нафасов Ганишер Абдурашидович, Эшкуватов Козим, Хикматова Гулрух Усар кызы ПЕДАГОГИЧЕСКИЕ ВОЗМОЖНОСТИ ПОВЫШЕНИЯ НАУЧНОЙ КОМПЕТЕНТНОСТИ БУДУЩИХ УЧИТЕЛЕЙ	190
Oguljema Orazmyradova, Gulnaza Matkarimova, Mukam Ekayev, Yazgeldiyev Muhammetmyrat TECHNOLOGY FOR PRODUCING PAINT TO PROTECT METAL MATERIALS FROM CORROSION	197
Бекжанова Гулнара Маркабаевна ГИСТОГЕНЕЗ НЕРВНОЙ ТКАНИ У МУЖЧИН	202
Какаджанов Мурад ГЛОБАЛИЗАЦИЯ И МЕЖДУНАРОДНЫЕ ОТНОШЕНИЯ В КОНЦЕ XX – НАЧАЛЕ XXI ВЕКА	206
Ниязмухаммедов Ниязмухаммет ИСТОРИЯ МОНЕТ СРЕДНЕЙ АЗИИ	209
Экеева Нагма КАК СТАТЬ СИМВОЛОМ ПАРИЖА, ЕСЛИ ТЫ НИКОМУ НЕ ПРАВИШЬСЯ: ИСТОРИЯ ЭЙФЕЛЕВОЙ БАШНИ	213
Маммедова Яныл Аннагелдиевна, Гурбанназарова Зубейда, Реджепова Оразгул, Нурыева Айсенем ВАЖНОСТЬ ФИНАНСОВОГО МОНИТОРИНГА БАНКОВСКИХ ОПЕРАЦИЙ И МЕЖДУНАРОДНЫЕ ТРЕБОВАНИЯ	216
Чаканов Ходжаберди, Нурыев Агамурад МОНЕТНЫЕ РЕФОРМЫ КАРЛА ВЕЛИКОГО И ИХ ВЛИЯНИЕ НА ЕВРОПУ	224
Гурбанов Мердан, Беглиева Акгуль НАЧАЛО МОНЕТНОЙ ЧЕКАНКИ В ГОСУДАРСТВЕ ТУРКМЕН-СЕЛЬДЖУКОВ	228
Овезбердиева Ширин Джорагелдиевна ВИРТУАЛЬНЫЕ АКТИВЫ И ТЕХНОЛОГИЯ БЛОКЧЕЙН	234
Салихова Марина Михайловна, Гареева Ольга Владимировна «ТВОРЧЕСКАЯ МАСТЕРСКАЯ» КАК ФОРМА ОРГАНИЗАЦИИ ПРОДУКТИВНЫХ ВИДОВ ДЕЯТЕЛЬНОСТИ ДОШКОЛЬНИКОВ, ЗНАКОМСТВО С ПРОФЕССИЯМИ	241
Какаджанов Мурад СОЗДАНИЕ ООН И ЕЁ РОЛЬ В МИРЕ	250

ФИО автора(-ов): *OGUZ HAN ENGINEERING AND TECHNOLOGY*

UNIVERSITY OF TURKMENISTAN

Teachers: Oguljema Orazmyradova

Gulnaza Matkarimova

Mukam Ekayev

Student: Yazgeldiyev Muhammetmyrat

Название публикации: «TECHNOLOGY FOR PRODUCING PAINT TO PROTECT METAL MATERIALS FROM CORROSION»

Abstract

Corrosion of metals represents a significant challenge across industrial sectors due to its detrimental effects on structural integrity, safety, and economic costs. Protective paints and coatings form a primary line of defense by providing a physical and chemical barrier between the metal substrate and corrosive environments. This paper reviews the fundamental principles of corrosion protective coating technology, advances in formulation and production, and the mechanisms by which protective paints impede corrosive processes. Emphasis is placed on modern polymeric coatings, nanostructured additives, and environmentally sound inhibitors that enhance corrosion resistance and performance. Engineering implications and future research directions are discussed. MDPI+1

1. Introduction

Corrosion is defined as the chemical or electrochemical deterioration of metals caused by environmental exposure, including humidity, salts, acids, and industrial pollutants. It leads to significant material loss, safety hazards, and economic burdens in sectors such as infrastructure, transportation, and maritime engineering. Protective coatings are designed to isolate metal surfaces from corrosive agents, thereby inhibiting oxidation and electrochemical degradation. Contemporary research strives to improve

coating durability, environmental friendliness, and performance under extreme conditions. [Наука и Просвещение](#)

2. Mechanisms of Corrosion Protection

Metal protective paints provide corrosion resistance primarily through:

1. **Barrier Effect** – formation of an impermeable film preventing ingress of oxygen, moisture, and ions.
 2. **Sacrificial Protection** – incorporation of metallic pigments (e.g., zinc) that corrode preferentially to the substrate.
 3. **Chemical Inhibition** – additives that interact with surface electrochemistry to reduce corrosive reaction rates.
 4. **Hydrophobicity** – surface chemistry that repels aqueous electrolytes, reducing water contact. [RSC Publishing+1](#)
-

3. Constituent Components and Formulation

Paint formulation for corrosion protection typically includes:

- **Resins** and **Binders:**

Thermosetting polymers such as epoxy, polyurethane, and polyester provide structural integrity and adhesion to substrates. They form a continuous matrix upon curing. [cn-pci.com](#)

- **Pigments** and **Fillers:**

Zinc, aluminium, and other corrosion-resistant pigments act as electrochemical barriers; inert fillers improve mechanical strength. [RONL](#)

- **Solvents** and **Plasticizers:**

Organic solvents ensure proper viscosity during application and evaporation during curing; plasticizers influence flexibility and film formation. [RONL](#)

- **Corrosion** **Inhibitors:**

Organic and inorganic inhibitors reduce anodic and cathodic reactions on the metal surface. Advances include conducting polymers and environmentally benign inhibitors. [MDPI](#)

4. Production Technology

4.1 Surface Preparation

Successful coating performance begins with surface pre-treatment to remove oils, oxides, and contaminants. Mechanical or chemical cleaning ensures adhesion and uniformity. unicoil.com.sa

4.2 Mixing and Dispersion

Polymeric binders, pigments, and additives are homogenized using controlled shear mixers to ensure dispersion of nano-scale fillers and corrosion inhibitors. Correct dispersion is critical for barrier performance.

4.3 Curing and Film Formation

Coating systems cure via thermosetting reactions (e.g., epoxy cross-linking) or physical solvent evaporation. Controlled curing parameters influence mechanical strength and long-term corrosion resistance.

4.4 Advanced Incorporation of Nanostructures

Recent developments incorporate nano-structured materials (e.g., nanocontainers with corrosion inhibitors, metal-organic frameworks) to enhance impermeability and self-healing properties. cn-pci.com

5. Performance Evaluation

Corrosion protective paints are evaluated by standardized tests such as salt spray (ASTM B117), electrochemical impedance spectroscopy (EIS), and adhesion/durability assessments. Enhanced coatings show increased impedance, lower corrosion current density, and improved adhesion after cyclic environmental exposure.

[MDPI](https://www.mdpi.com)

6. Case Studies of Protective Coating Types

6.1 Epoxy and Polymeric Coatings

Epoxy coatings are widely used due to strong adhesion and chemical resistance. Modifications with polyaniline and other conductive polymers have shown significant improvement in corrosion resistance under saline conditions. [arXiv](#)

6.2 Superhydrophobic and Smart Coatings

Superhydrophobic surfaces reduce contact with aqueous electrolytes, while smart coatings containing micro/nano-containers enable self-healing when micro-cracks form. [RSC Publishing+1](#)

6.3 Powder and Fusion Bonded Coatings

Powder coatings such as fusion bonded epoxy (FBE) offer high thickness uniformity and excellent corrosion protection, widely applied in pipeline and structural steel systems. [Wikipedia](#)

7. Environmental and Practical Considerations

Environmental regulations have driven research away from toxic pigments (e.g., lead, chromium) toward benign alternatives like zinc and polymeric inhibitors. Sustainable coatings must balance performance with ecological safety. [MDPI](#)

8. Conclusions

The technology of anti-corrosion paint production integrates chemical formulation, surface engineering, and materials science to achieve long-lasting protection of metallic substrates. Advances in nano-structured additives and smart corrosion inhibitors represent promising directions for improved coating performance. Continued multidisciplinary research will further enhance sustainability and effectiveness.

References (Select)

1. Huang, Y., Lin, G., Yue, L., Wang, T., Liu, X. & Zhang, B. *Superhydrophobic Anti-Corrosion Coatings for Metal Surfaces: A Systematic Review*

from Fabrication to Performance. **New Journal of Chemistry (RSC)** (2026). RSC Publishing

2. Insights into the Development of Nanostructured Anti-Corrosive Polymer Coating. **Polymers, MDPI** (2025). MDPI

3. Merkulov, V.V. et al., *Preparation of Polymer Coatings for Protection of Metal Structures*, **Structural Mechanics** (2024). RUDN Scientific Periodicals Portal

4. Fusion Bonded Epoxy Coating – Protective Coating Technology overview. **Wikipedia**. Wikipedia

5. Protective Performance of Water-Based Epoxy Coating Containing Nanopolyaniline. *arXiv preprint*