

الأساليب الكهروكيميائية الأنودية لمعالجة المنتجات المعدنية وأثرها على جودة السطح Anodic electrochemical methods for processing metal products and their effect on surface quality

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Abstract:

The quality of finishing the surface of the metal product is important as it is one of the main factors affecting the determination of the external appearance and the life of the product, especially when the surface of the product exposed to stresses of influence during use (friction - exposure to environments that help corrosion ... etc.) effect on the decision of the user to acquire the product or not, especially in products with aesthetic functions Therefore,

the problem of research is the urgent need to use modern systems to treatment the surface of the metal product will be more accurate and easy and fast in the application and less expensive in production and do not need special expertise

The objective of the research is to conduct an analytical study of the most important methods used in the treatment of metal products surfaces to identify the aesthetic, economic, functional and environmental values added by treating the surfaces of metal products electrochemically and to know their methods and the most important solutions used in them.

This will be done through **the hypothesis** that the application of electrochemical treatments to design and produce the appearance of the metal product surface achieves a great deal of environmental, aesthetic and technical compatibility and produces a metallic surface characterized by contrast between different conditions such as glossy surface, matte, dark and light surface and other surface appearance characteristics.

According to a descriptive analytical method, based on several axes:-

- Factors affecting the quality of the metal product surface.
- Anodic electrochemical processing of metal products and their importance
- Electrochemical methods used to improve the appearance of the metal product
- Classification of anode electrochemical processes
- Research experiments
- Conclusion and discussion

The research concluded with some results :

- 1 - The use of electrochemical systems in finishing has a positive impact on many factors affecting the quality of the surface product such as: contrast, harmony and luster as well as accuracy in the application of the appearance of the surface lines up to 0,2 mm in addition to friction and increase the shelf life of the surface the product .
2. Anodic electrochemical processes can be applied to most minerals and do not require skilled workers or distinctive technical skills at most stages.

3. Anodic electrochemical systems are characterized by very low economic cost compared with processes that produce similar results, such as laser and plasma operation and some mechanical processes, supporting their growth as a small industry.
4. Anodic processes are used to finish the surfaces of low-thickness metal products ranging from 0.1 to 0.5 millimeters, as well as solid metals that may be deformed or fractured when mechanically treated.
- 5 - Electrochemical etching methods are characterized by their efficiency with some products that are difficult to be dug by mechanical or non-conventional methods such as laser and plasma. Examples of these products are pipes with small diameters (from 20 to 8 millimeters,).
- 6 - Partial corrosion of some tools and means of operation may occur during the application of the Anodic processes, which affects the results of the process so it is preferable to manufacture these tools from the inactive metal such as titanium.
- 7 - Electrochemical processes do not have any stresses on the metal surface, and do not reduce stress, especially thermal and this give them a competitive advantage.