improvement surface appearance of low Carat Gold jewelery with chemical and electrochemical treatment

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Abstract

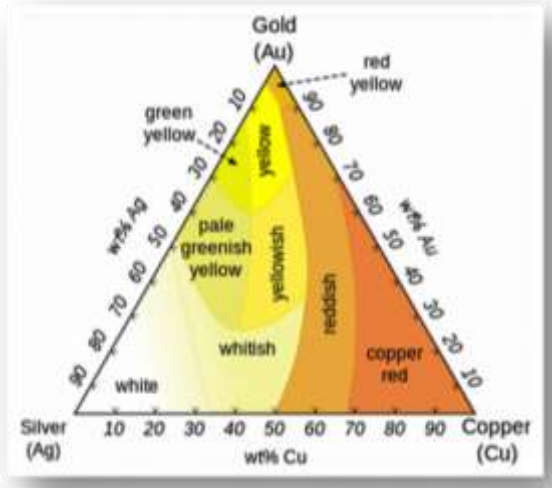
- Surface treatment and finishing technology in the manufacture of golden jewelery has gained a broader meaning than in the past as it is no longer just a result of the recent manufacturing process, but an important and inherent process in the jewelery industry, and is determined by the entire production process. Surface and finish are synonymous with quality.

- The process of treatment gold jewelry surfaces, is the last step in the manufacture and production of golden jewelry, and the surface treatment gives product's final appearance that fits with the design, and that determines the quality of the jewelry product, and is therefore the first factor in attracting the user's attention.

- There are several cases of surface treatments such as polishing and electropolishing, where the surface must have a high degree of reflection, and the color enrichment of alloys and making Texture with sanding (sand blasting) or drilling or hammer .... and other processes, and must know the jewelry designer process options Surface treatment and finishing when designing new models, as surface treatment is an integral part of jewelry ornaments design.

Keywords:

Gold Carats -Surface treatment - Electropolishing- Surface Enrichment



- We now realize that the greater the attention to the quality of the gold jewelery surface at each step of production, the finishing process will be simpler and less costly to obtain the required quality that meets the market needs with user satisfaction as the most important element and the ultimate goal of design and production processes.

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- The final finishing process depends on providing accurate information and practical advice that can be easily used by gold makers or production engineers. If we exclude the initial processes that are carried out to prepare gold jewelery for finishing, there are three basic systems for processing and finishing used in the production of golden jewelery are: -

• Mechanical finishing (polishing and other surface texture)
• Chemical treatment (enrichment and purification of alloy surface)
• Electrochemical treatment (Electroplating and polishing)

Statement of problem.

The problem of research is determined by the need to improve appearance of the surface low-carats gold jewelery to obtain the surface quality that meets the market needs and attract user attention.

Purpose.

- Determine factors affecting change appearance of the surface low-carats gold jewelery.
- Determine the methods of color enrichment (removal) for the appearance of the surface of low-caliber gold jewelry.
- Use electrochemical processes (as well) to improve surface appearance.

Research hypotheses

Treating gold ornaments with chemical solutions may improve the appearance of the surface and increase its aesthetic value.

Research Methodology

The research uses the descriptive analytical method.

Conclusion and discussion-

1-Pure gold is one of the precious metals with a yellow color and is resistant to corrosion and is the most flexible and elongated among most noble or precious metals so it associates with many metals to improve its mechanical properties.

2-Gold carats used in the manufacture of jewelery with carat consists of several metals, the most important of which are gold, copper, nickel and silver, including high carat gold (21 and 22) and low caliber (18, 14, 10 and 9).

Type	Gold % wt	Silver %	Copper %	color
22 ct	91.6	8.4	-	Yellow
	91.6	5.5	2.8	Yellow
	91.6	3.2	5.1	Deep yellow
	91.6	-	8.4	Pink/rose
18 ct	75.0	25.0	-	Green-yellow
	75.0	16.0	9.0	Pale yellow, 2N
	75.0	12.5	12.5	Yellow, 3N
	75.0	9.0	16.0	Pink, 4N
	75.0	4.5	20.5	Red, 5N
14 ct	58.5	41.5	-	Pale green
	58.5	30.0	11.5	Yellow
	58.5	9.0	32.5	Red
9 ct	37.5	62.5	-	White
	37.5	55.0	7.5	Pale yellow
	37.5	42.5	20.0	Yellow
	37.5	31.25	31.25	Rich yellow
	37.5	20.0	42.5	Pink
	37.5	7.5	55.0	Red

3-Low-carat gold jewelery shows some change in surface appearance due to exposure to sulfur-containing environments. The salts resulting in sweat and the nature of the alloy formation, etc., which cause many defects in the alloys of gold ornaments such as resistance to loss of luster and chemical corrosion and surface oxidation.

	Gold, % wt	Copper, % wt	Nickel, % wt	Zinc, % wt	Hardness Hv	Liquidus °C
14ct	58.5	22.0	12.0	7.4	150	995
10ct	41.7	32.8	17.1	8.4	145	1085
9ct	37.5	40.0	10.5	12.0	130	1040

4- Methods to improve the appearance of the surface of the jewelry are divided into two types: - removal treatment (polishing, laser, cyanide treatment and selective depletion gilding), treatment as well (electroplating, stone inlay and enameling).

5-Mechanical processes are used in finishing gold jewelery to significantly reduce manpower and reduce production costs compared to laser finishing operations. Different types of finishing equipment and media can be used in the mechanical process, and are selected according to the type of product to be completed.

6 Chemical treatments for low-carats gold jewelery are divided into two types, cyanide treatment

Bombing and selective gilding (Depletion gilding).

7-Cyanide concentration should be maintained and temperature reduced as much as possible, consistent with surface quality and success of the process, and no excessive use of cyanide blasting for health and safety reasons. And the use of processors that have the same results and non-cyanide.

-8 - Selective gilding (Depletion gilding) is an appropriate and distinct alternative to cyanide treatment because it uses acidic solutions and non-cyanide salts in the treatment of low-caliber gold jewelry surfaces.

9-The electrochemical polishing process is based on selective removal by anodic treatment of layers of gold jewelery surfaces

It features fast performance and polishing work in large numbers and easy recovery of melted gold.

10 - The treatment of gold jewelery electroplating process is to obtain aesthetic treatments with a long service life and to improve the appearance of the surface of the most important solutions: solutions of pure gold plating and rhodium plating solutions.

11- Solution treatments in some cases have a more corrosive effect than mechanical treatments, but for low-carats gold alloys, chemical treatment can cause color changes, especially when used in more than one finishing stage.

- Recommendations

- In the case of mass manufacturing of gold-plated jewelery, we recommend studying chemical finishing in more detail, although it is recognized that manual finishing still holds its place in many manufacturers. However, chemical and electrochemical finishing is gaining increasing acceptance due to the high level of quality as well as the economy of the workforce that can be achieved. This will lead to a significant reduction in costs.

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