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A UNIQUE METHOD OF ADHESIVE WIG ATTACHMENT FOR BLYTHE DOLLS USING NATURAL SHEEP HAIR WEFTS

Annotation: A new method for forming an adhesive base on a silicone wig sleeve is presented, achieving a balance between strength and flexibility. Through careful selection of adhesive components and optimization of application parameters, long-lasting attachment has been ensured even under active use of the doll.

This article is a continuation of the study exploring the phenomenon of Blythe doll customization, titled "An Innovative Approach to Blythe Doll Customization: An Original Method for Creating Wigs from Natural Sheep Wool" [UDC 5527]. Keywords: Blythe doll customization; sheep wool wigs; silicone base; adhesive bonding; polymer matrix; elastic glue; decorative applied art; wig durability; hair wefts; handmade.

Introduction.

Blythe doll customization is a branch of decorative and applied arts that combines elements of sculpture, painting, textile design, and perceptual psychology.

Modern Blythe customization techniques require the preservation of the doll's sculpted head shape during repeated hairstyle changes and intensive wig handling [1][2].

Traditional adhesive formulations are either too rigid (causing deformation of the silicone base) or insufficiently strong (resulting in hair wefts falling out during brushing) [3][4].

The aim of this study is to develop a composition and application method for an adhesive base that ensures reliable weft fixation, styling flexibility, and long-term durability under active use of customized Blythe dolls.

Materials and Methods

1. Base Selection

Typically, a silicone wig base is used (thickness 0.5 mm, Shore A 20–30). This is a soft silicone material with a texture similar to rubber or skin. It does not crack when bent, does not slip on the doll's head, and provides a comfortable fit and long-lasting wear. It is ideally suited for securing heavy wefts made from natural wool [5].

Pic.1. Silicone wig base for a Blythe doll

2. Adhesive Composition Development

A own functional adhesive was developed specifically for use under delicate conditions, making it ideal for doll customization. The formulation is based on a polymer matrix using a silicone copolymer combined with an elasticity modifier (a dioxazine plasticizer) and a curing accelerator based on a peroxide catalyst at a concentration of 0.5 wt%.

3. Application Technique

A custom multilayer application technique was employed using a fine roller (0.1–0.2 mm per pass) at a temperature of +25 °C. Each layer was pre-cured in a thermal chamber at 40 °C for 5 minutes.

4. Testing

The adhesive's reliability and the wig's resistance to active use were evaluated. A proprietary method was used, combining mechanical testing (ASTM D412) with a simulation of brushing during actual use.

ASTM D412 — Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension [7]. This method allows for the measurement of tensile strength, elongation at break (%), and modulus of elasticity. It is applied to evaluate the adhesive bond between the weft and the silicone base.

Brushing resistance test (use simulation): a specialized doll brush with metal bristles is used. The wig is fixed in place and subjected to 500 brushing cycles (forward-backward = 1 cycle). The number and weight of shed wefts, the presence of adhesive delamination, and the preservation of the base shape and hairstyle are measured [8].

Pic.2. Doll Elena after the brushing resistance test

Results

Bond Strength: The average weft peel strength was 1.8 N (±0.2 N), which is three times higher than that of a wig made using traditional textile base techniques with PVA-type glue [9].

Elasticity: The base could stretch up to 200% without cracking the adhesive film.

Durability: Less than 5% of the wefts were lost after 500 brushing cycles, compared to 25% loss with conventional adhesives.

Conclusion

Thanks to its polymer matrix, the developed adhesive maintains flexibility even at low temperatures, which is important for storage and transportation [10].

The multilayer application technique prevents the formation of glue “bridges” and promotes even load distribution.

The original adhesive base application method proved highly effective, ensuring reliable weft attachment, flexibility, and natural-looking styling, as well as long-term durability under active use.

Pic.3. Dolls Margarita and Anna after one year of use

Summary

Darya Zhauneryk's unique method of adhesive fixation for Blythe doll wigs made from natural sheep wool wefts is an innovation in the world of doll customization. It expands the expressive and artistic possibilities of the doll as an art object:

a) Enables greater realism and reliability of weft-to-base bonding.

b) Allows for individualized character design.

c) Provides flexibility in creating unconventional hairstyles and textures.

Pic.4. Blythe doll Marina with original hairstyle

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