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[54] **HAIR PIECES, WIG AND LIKE PRODUCTS**

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[51] **Int. Cl.** **A41g 3/00**

[58] **Field of Search** 132/5, 53, 54; 66/9; 19/106; 264/210, 290

[56] **References Cited**

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[57] **ABSTRACT**

Hair pieces, wigs and like products in which the predominant hair-simulating fiber is a blend of nylon-6 and a polyalkyl methacrylate, method of making fiber, and fiber.

3 Claims, No Drawings

HAIR PIECES, WIG AND LIKE PRODUCTS

This invention relates to wigs and hair pieces which can be dyed, set, bleached, redyed and reset an almost unlimited number of times.

The use of wigs and hair pieces has increased very substantially in recent times but has, to some extent, been limited by inability of the wigs or hair pieces to be restyled and/or redyed without deterioration of the hair piece. Thus it has been necessary to own a large number of hair pieces or wigs in order to provide the owner with a variety of styles and/or colors. Many attempts have been made to utilize synthetic fibers in place of human hair, but generally these lack the desirable qualities necessary for an esthetically satisfactory hair piece. Typically, such synthetic materials may have an excessively shiny appearance, an unsatisfactory hand, and most often cannot be stripped of color in a manner to permit redying and restyling.

It has now been found that certain polymer blends of nylon with polyalkyl methacrylates can be formed into fibers and drawn to provide a fibrous material closely resembling human hair with respect to hand and luster. Wigs or hair pieces made from these fibers can be dyed, set, stripped and redyed and reset innumerable times. This fibrous material is ideally suited for the production of wigs and other hair pieces.

More specifically the blends contemplated for the present invention comprise in excess of 70% by weight, but less than 90% by weight of nylon-6 (polycaprolactam) and less than 30%, but more than 10%, of a polyalkyl methacrylate having a glass transition temperature (Tg) in the range of about 50°C. to about 110°C., and preferably in the range of about 88° to 105°C. As used herein, the term polyalkyl methacrylate is intended to encompass any composition in which the predominant component is a polyalkyl methacrylate, or in which the predominant monomeric component of the polymer is an alkyl methacrylate but which may contain minor amoutns, e.g., 10% or less of other compatible polymers or comonomers, provided the glass transition temperature of the resulting material meets the requirements specified above. Additionally, the polyalkyl methacrylate shall be selected such that the ratio of its melt viscosity to that of nylon-6 shall be equal to or greater than 1. Thus, for example, a 95/5 copolymer of methylmethacrylate and ethyl acrylate is included within the scope of the present invention, as would be a blend of polymethyl methacrylate with 5% polyethyl acrylate.

Fibers produced from the above composition are drawn to the general denier of human hair, which averages on the order of 50 to 75 denier. The drawing is conducted at a draw ratio of greater than 2:1 but less than 4:1, and preferably in the range of from about 2.75:1 to about 3:1. The fibers are drawn at a hot pin drawing temperature of at least 5°C above the glass transition temperatures of the polyalkyl methacrylate additive, preferably at about 130°C. Higher temperatures can be used but do not contribute substantially to the overall processing.

The above described conditions are for the most part critical to the satisfactory attainment of the objectives of the present invention. At a nylon content of about 70%, the fibers are found to be too weak and to have too low a fiber elongation for use in hair piece manufacture. However when the amount of nylon reaches

about 90%, the filamentary material will not curl to the extent necessary to simulate the curling of human hair.

If the filamentary material is produced at lower draw ratios than those specified, the fiber will exhibit excessive cold drawing with its obvious concommitant undesirable characteristics. At higher draw ratios the fibers become too highly oriented; elongation and elasticity are lost and the fiber does not dye well. The draw pin temperature can of course be varied. However, lower pin temperatures tend to result in unevenly drawn fibers which dye unevenly.

In an example of the invention, a blend of 20% polymethyl methacrylate and 80% nylon-6 was prepared in an extruder by usual means, i.e., chips of the methacrylate and nylon were mixed in the appropriate proportions and fed to an extruder to produce a thoroughly blended extrudate. The methacrylate polymer consisted essentially of a copolymer of methyl methacrylate with about 4% by weight of ethyl acrylate, which copolymer had a viscosity average molecular weight of about 155,000. The nylon-6 had a relative viscosity (one part by weight nylon in 100 parts by volume of 97% sulfuric acid at 25°C.) of about 2.4, and the chip contained 2% by weight of titanium dioxide. From this blend were formed fibers of 150 denier. These fibers were hot drawn at a hot draw pin temperature of 130°C. to 50 denier. These hot-drawn fibers exhibited a tenacity of 2.8 grams per denier and a residual elongation of 84%.

The above fibers can be tufted either individually or as a yarn bundle into any elastomeric power net to provide a hair piece which can be dyed, styled, stripped of dye, redyed, and restyled a multitude of times using essentially standard hair dyes and treatment conditions. The resulting hair pieces are found to approximate the more desirable characteristics of natural hair wigs but at a much-reduced cost. Most of the drawbacks found in ahir pieces made from synthetic fibers are absent or minimized in these novel hair pieces.

Equivalent results are obtained using, as the additives, homopolymers of methyl methacrylate as well as copolymers with 1% ethyl acrylate and the acrylate and methacrylate monomers which do not adversely affect the glass transition temperature or ratio of melt viscosities as specified earlier herein.

Similarly, it is possible to utilize higher viscosity nylon-6, viz., nylon having a relative viscosity of the order of 2.6 – 2.75 without adversely affecting the usefulness of the fibers for wig purposes. The chip may contain titanium dioxide or other dulling pigment or be free of such materials depending on the degree of shininess tolerable. The present materials are not generally as shiny as straight nylon-6 fibers, but pigment additions or other dulling agents may be desirable.

In general, the fibers useful for the purpose of the present invention have a tenacity of at least 1.8 grams per denier and a fiber elongation of at least 80%.

What is claimed is:

1. In a hair piece, wig or the like, comprising a fiber-supporting substrate and hair-simulating fibers, the improvement which comprises, as the predominant hair-simulating fibers, hot-drawn fibers of a blend of in excess of 70% but less than 90% by weight of nylon-6, and less than 30% but more than 10% of a polyalkyl methacrylate having a glass transition temperature in the range of about 50°C. to about 110°C., said blend characterized by a ratio of methacrylate polymer/nylon

melt viscosities of at least 1, said predominant fibers characterized by a tenacity of at least 1.8 grams per denier and an elongation of at least 80%.

2. A hair piece, wig, or the like, in accordance with claim 1 wherein said methacrylate polymer is a polymer of methyl methacrylate containing not more than 5% ethyl acrylate.

3. A hair piece, wig or the like in accordance with claim 2 wherein said blend comprises about 20% by weight of the polymethyl methacrylate polymer and about 80% by weight of nylon-6.

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