ABSTRACT: A process for producing bateau free dyeing of polyamide fibers comprising dyeing said fibers with a composition comprising an acid dye and a dialkyl sulfosuccinate having the following formula:

\[
\text{H} \equiv \text{C} \equiv \text{COOR} \\
\text{MOS} \equiv \text{COOR} \\
\text{H}
\]

wherein \( R \) is an alkyl radical having from four to 18 carbon atoms and \( M \) is either an alkali metal, alkaline earth metal, ammonium, or a substituted ammonium radical.
PROCESS FOR DYING POLYAMIDE FIBERS

The instant invention is directed to a process of uniformly dyeing polyamide fibers. In the past, the commercial practice of dyeing the synthetic linear polyamides more familiarly known as nylon has been carried out by means of dispersed or acetate dyestuffs. These dispersed dyestuffs have great covering power for nylon yarns and are not highly sensitive to the normal variations found in such yarns. However, the dispersed or acetate colors lack fastness to light and to washing. In contrast, the anionic dyestuffs best exemplified by the class of acid dyes have extreme fastness to light but lack fastness on nylon to both light and washing. It has not been commercially feasible to utilize the anionic dyestuffs in the majority of nylon filament dyings, however, since those dyestuffs are extremely sensitive to variations between different fibers and different parts of the same fibers. Nylon yarns which have been spun at different times or from different lots of polymer demonstrate these variations most clearly. Frequently, yarns spun at different times are dyed to different shades with the anionic dyestuffs when dyed by standard dyeing procedures. As a result, the nylon fabrics dyed with anionic dyes are often colored in an uneven fashion, showing streaks and shade depth variations in knitted goods, and broad effects in the warp and weft of the like inwoven goods.

The inability to secure even dyeing of nylon yarns and fabrics is believed to be due to slight variations in the physical structure of the parent polymers such as variations in orientation due to the drawing to which each filament is subjected. Other factors occurring in the spinning and processing of the yarn, the mechanical action of the textile machinery used in the knitting or weaving of the fabrics, and perhaps other causes as well, also affect the even dyeing of nylon yarns and fabrics. This inability to evenly dye nylon yarns and fabrics with the anionic dyestuffs has curtailed the large scale use of such dyestuffs for dyeing the nylon materials on which they exhibit excellent light and wash fastness properties.

In addition, many explanations have been offered to explain the barre phenomenon, none of which has been completely satisfactory. However, it is known that both the drawing of the polymer filament and the heat history of the filament itself are responsible for the apparent lack of uniformity in the final dyeing. The drawing of the polymer filament is a necessary step to the full development of the desirable physical properties of the fiber, such as strength and elasticity. During the drawing the polymer molecules become highly oriented, therefore creating the possibility and conditions for the formation of groups of chain ends alternating with or following highly crystalline areas of packed parallel molecules. Since it has been theorized that the terminal amino groups of the polymer chains are the more important and more readily accessible sites to the dye, it is easily seen why the uniformity of dyeing would be impaired by the drawing of the polymer filament.

With regard to the heat history of the filament, it can be said that heat affects the polymer-structure of the filament at each processing step. Exposure to heat results in a decrease in the crystallinity of the polymer along with additional molecular rearrangement phenomena such as chain dislocation etc. The extent of these changes is influenced by the temperature reached and by the moisture present.

Numerous dyeing systems have been developed in an attempt to overcome the lack of leveling and uniformity associated with the use of acid dyes. These systems have included cationic agents which tend to complex the acid dye and release it gradually so as to retard the dyestuff strike, and the use of colorless anions designed to compete with the dye for the fiber dye sites so as to retard the dyestuff.

All of these systems, however, are suited to only a small number of dyes and become limited by their own selectivity in this respect.

Therefore, it is an object of the instant invention to provide a dyeing system for polycarbonamides which produces a level, uniform, and barre free dyeing effect and which employs a large number of different dyestuffs.
shades in which higher percentages of dyes are employed. Therefore, in general when one employs from 0.05 percent to 1 percent (OWF) of dye, said amounts based on the weight of the goods, one would use about 4 percent (OWF) of sulfosuccinate. When 1 percent to 2 percent (OWF) of dye is employed, one would use about 2 percent (OWF) of the succinate, and about 1 percent (OWF) of the succinate would be employed when about 2–4 percent (OWF) of the dye is employed. The sulfonated dialkyl succinates can also be added at various stages during the dyeing process or they may be used to repair defective dyeings. The useful sulfonated dialkyl succinates have a retarding action on the dyestuff exhaustion and definitely affect mobility of the dye by increasing its migration and transfer properties.

The useful acid and direct dyes which may be employed in connection with the instant invention include water-soluble nonmetallized acid dyes of various groups such as monoazo, diazo, anthraquinone, etc. These dyes are preferably nonmetallized complex containing acid dyes and include, but are not limited to:

<table>
<thead>
<tr>
<th>C.I. Name</th>
<th>C.I. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milling Yellow O</td>
<td>Acid Yellow 38 25135</td>
</tr>
<tr>
<td>Supranol Yellow GGA</td>
<td>Acid Yellow 40 10950</td>
</tr>
<tr>
<td>Fast Light Yellow GXXN</td>
<td>Acid Yellow 17 18960</td>
</tr>
<tr>
<td>Wood Fast Orange GA</td>
<td>Mordant Orange 6 26520</td>
</tr>
<tr>
<td>Supranol Orange RA</td>
<td>Acid Orange 45 22195</td>
</tr>
<tr>
<td>Supranol Red RL</td>
<td>Acid Red 99 23285</td>
</tr>
<tr>
<td>Supranol Red PG</td>
<td>Acid Red 85 22425</td>
</tr>
<tr>
<td>Supranol Brilliant Red BA</td>
<td>Acid Red 133 17995</td>
</tr>
<tr>
<td>Supranol Red PBY</td>
<td>Acid Red 114 23635</td>
</tr>
<tr>
<td>Alizarine Supra A</td>
<td>Acid Blue 25 62055</td>
</tr>
<tr>
<td>Phenamine Scarlet B</td>
<td>Direct Red 37 22240</td>
</tr>
<tr>
<td>Chrome AY</td>
<td>Direct Yellow 12 24089</td>
</tr>
<tr>
<td>Supra Light Rubine BLA</td>
<td>Acid Red 32 17065</td>
</tr>
<tr>
<td>Alizarine Astral B</td>
<td>Acid Blue 27 61530</td>
</tr>
<tr>
<td>Alizarine Sky Blue BS</td>
<td>Acid Blue 78 62105</td>
</tr>
<tr>
<td>Alizarine Supra SKA</td>
<td>Acid Blue 62 63045</td>
</tr>
<tr>
<td>Alizarine Cyanine</td>
<td>Acid Green 25 61570</td>
</tr>
<tr>
<td>Green GHN</td>
<td>Acid Green 44 61590</td>
</tr>
<tr>
<td>Sulphon Cyanine SRA</td>
<td>Acid Blue 113 26360</td>
</tr>
<tr>
<td>Sulphon Cyanine GEA</td>
<td>Acid Blue 120 26400</td>
</tr>
<tr>
<td>Sulphon Cyanine GA</td>
<td>Acid Blue 118 26410</td>
</tr>
<tr>
<td>Anthraquinone Violet D</td>
<td>Acid Violet 34 61710</td>
</tr>
<tr>
<td>Alizarine Fast Grey BLN</td>
<td>Acid Black 48 63005</td>
</tr>
</tbody>
</table>

The dye system of the instant invention is operable at a broad range of pH's with the preferred range being a pH of from 3 to 7. Furthermore, the system may be employed at various temperatures and satisfactory dyeings are obtained even below the boil. The preferred temperature range, however, is from about 160° to about 230°F. In this regard, it is of note that when one employs the novel process of the instant invention, one is able to carry out dyeing procedures at lower temperatures than those conventionally employed in such processes.

In addition to the production of level and barren dyeings in the coloring of other types of nylon materials, the instant system is also useful in connection with the dyeing of nylon carpetings. In the past, when nylon carpetings having a jute backing were dyed, the nylon become stained as a result of the natural coloring matter bleeding off the jute in the dye bath. Its concentration in the dye bath increases as the dyeing progresses, and the nylon which has a pronounced affinity for this brown-colored matter picks it up readily. The resulting brown coloration which has a very low-light fastness, adversely affects the fastness and the purity of the final shade. The use of dialkyl sulfosuccinates in the dyeing of jute-backed nylon carpetings prevents the brown matter coming off the jute backing from affecting the final shade of the nylon surface.

In addition, it has also been found that the useful dialkyl sulfosuccinates can be employed to repair barren dyeings. These sulfosuccinates as noted previously increase the migrating, the mobility and transfer properties of acid nonmetallized dyes. In general, the goods can be heated in a bath with the dialkyl sulfosuccinate to about 90°–120°F. An alkaline pH is established so as to encourage the migration of the dye off the fiber. Any suitable alkaline material may be employed such as ammonium hydroxide. The bath can be taken to the boil or close thereto over about 30 minutes and maintained there for at least about 45 minutes. At this point, a great deal of dye has been transferred from the fabric to the dye bath. To return this dye to the fiber in the presence of the barre suppressant which we have in the bath, a gradual addition of prefiltered acetic acid can be made (about 2 percent OWF) to bring about satisfactory exhaustion of the dye bath. The resulting dyeing, assuming that suitable dyestuffs have been used, should be barren free. If additional dyestuff is required for shade adjustment, it may be added at any time before the acetic acid additions.

The novel process of the instant invention can be employed in connection with numerous forms of polycarbonamide fibers, including but not limited to woven, felted, filament, staple fiber, yarn, slubbing, wound packages, etc.

The present invention will now be described by reference to the following specific examples. Such examples are presented for purposes of illustration only, and the present invention is in no way to be deemed as limited thereto.

EXAMPLE I

Comparative dyeings were made of 10 gram samples of textured nylon 66 (Banlon, Joseph Bancroft & Company) using dye baths comprising:

A. 0.2 percent OWF Dye plus 1 percent ethoxylated nonionic surfactant comprising nonyl phenol+30 mols E.O., 75 percent acetate and 5 percent ammonium sulfate. (E.O. means ethylene oxide.)

B. 0.2 percent OWF Dye plus 4 percent Sodium bis-(2,6-dimethyl-heptyl)-4-sulfosuccinate.

The baths were established at a ratio of 1 gram of fabric to 40 cc. liquid, and the temperature raised to the boil over a period of 45 minutes, after the first 30 minutes of which 1 percent acetic acid (56 percent) was added to the bath (A). The dye baths were maintained at this temperature for a period of 1 hour, and the samples were subsequently rinsed and dried. They were also critically examined for levelness and barre. The dyeings were tested for light fastness according to the AATCC Standard Method 16A–1964. A rating scale of 1 to 5 was used in which 5 indicates a level or barren free dyeing and 1 a dyeing showing an uneveness or a pronounced degree of barren.

As may be seen from table I, there was a dramatic improvement in both levelness and barren effect when sodium bis-(2,6-dimethyl-heptyl)-4-sulfosuccinate was employed in the dye bath.

<table>
<thead>
<tr>
<th>Table I</th>
<th>Improvement in —</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employing dye bath</td>
<td>Levelness Barré Lightfastness</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Milling Yellow O (Add Yellow 48—C.I. 25138)</td>
<td>2</td>
</tr>
<tr>
<td>Supranol Yellow GGA (Add Yellow 40—C.I. 18950)</td>
<td>4</td>
</tr>
<tr>
<td>Fast Light Yellow GXXN (Add Yellow 47—C.I. 25195)</td>
<td>4</td>
</tr>
<tr>
<td>Wool Fast Orange GA (Mordant Orange 6—C.I. 26305)</td>
<td>4</td>
</tr>
<tr>
<td>Supranol Orange RA (Add Orange 44—C.I. 25128)</td>
<td>1</td>
</tr>
<tr>
<td>Supranol Red RL (Add Red 50—C.I. 23650)</td>
<td>8</td>
</tr>
<tr>
<td>Supranol Brilliant Red BA (Add Red 133—C.I. 17995)</td>
<td>2</td>
</tr>
<tr>
<td>Supranol Brilliant Red BA (Add Red 116—C.I. 23630)</td>
<td>2</td>
</tr>
</tbody>
</table>
EXAMPLE II

Comparative dyeings were made of 10 gram samples of taffeta (nontexturized nylon 66 filaments). The fabric was rolled and introduced in the stainless steel wire baskets available on the Vistamatric (Ahiga) automatic dyeing equipment. The dye baths comprised:

a. 0.2 percent of Dye OWF
b. 0.2 percent OWF Dye and 4 percent sodium bis(2,6-dimethyl-heptyl-4)-sulfo succinate.

The baths were established at a ratio of 1 gram of fabric to 40 cc. of liquid and the temperature raised to 200°F., over a period of 45 minutes. After the first 30 minutes at this temperature 1 percent of acetic acid (56 percent) was added to both (a) and (b). The dyings were maintained at 200°F. for 30 minutes longer and the samples were subsequently rinsed and dried.

The dyings were rated for levelness and barè as in example I. As may be seen from table II there was a dramatic improvement in both levelness and barè when sodium bis(2,6-dimethyl-heptyl-4)-sulfo succinate was employed in the dye bath.

<table>
<thead>
<tr>
<th>TABLE II</th>
</tr>
</thead>
</table>

**Improvement in Levelness**<br>**Barè**

| Milling Yellow O (Acid Yellow 38) (C.I. 25135) | 2 | 5 | 3 | 5 |
| Wool Fast Orange GA (Mordant Orange 8) (C.I. 26520) | 2 | 5 | 3 | 5 |
| Supronol Red PG Extra (Acid Red 85) (C.I. 22245) | 1 | 2 | 4-5 | 4 |
| Supronol Red RL (Acid Red 91) (C.I. 21253) | 2 | 4-5 | 2 | 4-5 |
| Supronol Light Rubine BLA (Acid Red 52) (C.I. 17065) | 3 | 5 | 3 | 4-5 |
| Alizarine Atom B (Acid Blue 27) (C.I. 61530) | 2 | 3 | 5 | 4-5 |
| Alizarine Sky Blue BS (Acid Blue 78) (C.I. 62050) | 3-4 | 5 | 3-4 | 4-5 |
| Alizarine Supra Sky Ra (Acid Blue 62) (C.I. 62045) | 4 | 5 | 3-4 | 5 |
| Alizarine Cyanine Green GHN (Acid Green 25) (C.I. 61570) | 2 | 4-5 | 2 | 4-5 |
**EXAMPLE IV**

Texturized nylon (nylon 66 - Banlon, Joseph Bancroft & Company) was added at room temperature to three groups of dye baths prepared and handled exactly as in example III for the use of 0.5 percent OWF of dye in each.

Table IV in addition to listing barre and lightfastness ratings for each group of dyeings according to the rules set forth in example I, also gives ratings for the degree of dye exhaustion.

The degree of exhaustion rating was obtained in the following manner.

After the dyeings were removed the dye baths were strongly acidified by the addition of 2 percent OWF of formic acid (90 percent). Undyed nylon 66 skeins of equal weight to the samples dyed were immersed in the bath so prepared and run at the boil for 45 minutes. After rinsing and drying these skeins the depth of dying was compared to that of the original dyeings estimating in this fashion the percent of dye removed from the dye bath by the original dying.

Table IV confirms the results observed in example III and in addition, shows that the use of the sulfonic acid followed by lowering of the pH of the dye bath has resulted in as good a degree of exhaustion of the dyestuff from the baths as that obtained in the dyeings without additive (group 1 and 2).

![Chemical structure](image)

**TABLE III**

<table>
<thead>
<tr>
<th>Dye (corresponding to structure number)</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent</td>
<td>Barre</td>
<td>Lightfastness</td>
</tr>
<tr>
<td>I</td>
<td>0.2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>II</td>
<td>0.2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>III</td>
<td>0.2</td>
<td>3</td>
<td>3-4</td>
</tr>
<tr>
<td>IV</td>
<td>0.2</td>
<td>2-3</td>
<td>2-3</td>
</tr>
<tr>
<td>VI</td>
<td>0.2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>VII</td>
<td>0.2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>VIII</td>
<td>0.2</td>
<td>2-3</td>
<td>2-3</td>
</tr>
<tr>
<td>Allizine Super Blue A</td>
<td>0.2</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

**EXAMPLE V**

Comparative dyeings were made of 10 g. samples of tiger cloth (i.e., a knit fabric made of alternating bands of variously texturized filament nylon 66) added to a dye bath comprising: 0.2 percent dye OWF which was then raised over a period of 30 minutes to the boil. Ten percent common salt was then added and the dye bath temperature maintained for an additional 45 minutes. As may be seen from table V, the dyeings had a predominant barre effect.

**TABLE IV**

<table>
<thead>
<tr>
<th>Dye</th>
<th>Percent</th>
<th>Barre</th>
<th>Lightfastness</th>
<th>Estimated percent exhaustion</th>
<th>Barre</th>
<th>Lightfastness</th>
<th>Estimated percent exhaustion</th>
<th>Barre</th>
<th>Lightfastness</th>
<th>Estimated percent exhaustion</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0.5</td>
<td>3-4</td>
<td>5-6</td>
<td>60</td>
<td>3-4</td>
<td>5-6</td>
<td>60</td>
<td>4-5</td>
<td>6-7</td>
<td>60</td>
</tr>
<tr>
<td>II</td>
<td>0.5</td>
<td>4-5</td>
<td>6</td>
<td>98</td>
<td>4</td>
<td>5-6</td>
<td>95</td>
<td>5-6</td>
<td>6</td>
<td>98</td>
</tr>
<tr>
<td>III</td>
<td>0.5</td>
<td>6</td>
<td>98</td>
<td>98</td>
<td>6</td>
<td>5-6</td>
<td>95</td>
<td>5</td>
<td>5-6</td>
<td>98</td>
</tr>
<tr>
<td>IV</td>
<td>0.5</td>
<td>3</td>
<td>98</td>
<td>98</td>
<td>6</td>
<td>5-6</td>
<td>95</td>
<td>5-6</td>
<td>6</td>
<td>98</td>
</tr>
<tr>
<td>V</td>
<td>0.5</td>
<td>4</td>
<td>98</td>
<td>98</td>
<td>6</td>
<td>5-6</td>
<td>95</td>
<td>5-6</td>
<td>6</td>
<td>98</td>
</tr>
<tr>
<td>VI</td>
<td>0.5</td>
<td>3</td>
<td>98</td>
<td>98</td>
<td>6</td>
<td>5-6</td>
<td>95</td>
<td>5</td>
<td>5-6</td>
<td>98</td>
</tr>
<tr>
<td>VII</td>
<td>0.5</td>
<td>4</td>
<td>98</td>
<td>98</td>
<td>6</td>
<td>5-6</td>
<td>95</td>
<td>5</td>
<td>6</td>
<td>98</td>
</tr>
<tr>
<td>VIII</td>
<td>0.5</td>
<td>3</td>
<td>98</td>
<td>98</td>
<td>6</td>
<td>5-6</td>
<td>95</td>
<td>5</td>
<td>6</td>
<td>98</td>
</tr>
<tr>
<td>Allizine Super Blue A</td>
<td>0.5</td>
<td>4</td>
<td>98</td>
<td>98</td>
<td>6</td>
<td>5-6</td>
<td>95</td>
<td>5</td>
<td>6</td>
<td>98</td>
</tr>
</tbody>
</table>

**EXAMPLE VI**

Ten gram samples of tiger cloth were added to a dye bath comprising 0.2 percent Dye and 4 percent Sodium bis-(2,6-dimethyl-heptyl-4) sulfosuccinate. The temperature of this dye bath was raised to the boil over a period of 30 minutes and 1 percent acetic acid was then added. The temperature of the dye bath was maintained for an additional 45 minutes. As may be seen from table V, the resulting dyeings were free from the barre effect.

**TABLE V**

<table>
<thead>
<tr>
<th>Dye (Same as Table III)</th>
<th>10% Salt after 30 min.</th>
<th>(Ex. V)</th>
<th>10% Salt after 30 min.</th>
<th>(Ex. VI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>II</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>III</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>IV</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>V</td>
<td>3</td>
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<td>4</td>
</tr>
<tr>
<td>VI</td>
<td>3</td>
<td>4-5</td>
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<tr>
<td>VII</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>VIII</td>
<td>3-4</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Allizine Super Blue A</td>
<td>3-4</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**EXAMPLE VII**

Twenty gram samples of nylon 6 carpet (Allied Chemical Corporation) were dyed in dye baths comprising: 0.2 percent OWF Celliton Fast Blue FFRN (Disperse
3,619,122

EXAMPLE VIII

Samples of nylon 6 carpet (Allied Chemical Corporation) were dyed in dye baths having the following composition:
a. 0.2 percent Supra Light Rubine BLA (Acid Red 32 - C. I. No. 17065)
b. 0.2 percent Supra Light Rubine BLA 4 percent Sodium bis-(2,6-dimethyl-heptyl-4) sulfosuccinate
c. 0.2 percent Alizarine Fast Gray BLN (Acid Black 48 - C. I. No. 65005)
d. 0.2 percent Alizarine Fast Gray BLN 4 percent Sodium bis-(2,6-dimethyl-heptyl-4) sulfosuccinate.

All the dye baths were raised to the boil over a period of 45 minutes. After the first 30 minutes 1 percent acetic acid (56 percent) was added to each of the dye baths to complete the exhaustion of the dyes from the bath. Sample (a) showed an uneven dying result due to barrass and not to a lack of levelling, and the color was altered by light in a brick-red color. Sample (b) showed an improved dying result and the barrass effect was greatly reduced and the true shade of the Rubine dye was unaltered by light. Sample (c) resulted in an uneven dying due to barrass and a greenish-gray shade of color, while sample (d) showed a much more uniform dying and a considerable reduction in barrass and the true blue shade characteristic of the dye was apparent.

EXAMPLE IX

Comparative dyings were made of 10 gram samples of nylon 6, nylon 6, nylon 11, nylon 610, nylon 6/6, Perlon and Risan, using dyes particularly comprising those in table I:
a. 0.2 percent OWF Dye plug 1 percent ethoxylated nonionic surfactant comprising nonyl phenol + 30 mols E.O., 75 percent active and 6 percent ammonium sulfate.b. 0.2 percent OWF Dye plus 4 percent Sodium bis-(2,6-dimethyl-heptyl-4) sulfosuccinate.

In each instance there was a dramatic improvement both in levelling and barrass effect when sodium bis-(2,6-dimethyl-heptyl-4) sulfosuccinate was employed in the dye bath, as per the procedure in example I.

EXAMPLE X

Comparative dyings were made of 10 gram samples of texturized nylon 66 using dye baths comprising those in table I:
a. 0.2 percent OWF Dye plus 1 percent ethoxylated nonionic surfactant comprising nonyl phenol + 30 mols E.O., 75 percent active and 6 percent ammonium sulfate.b. 0.2 percent OWF Dye plus 4 percent Sodium bis-(2,6-dimethyl-heptyl-4) sulfosuccinate.

The procedure of examples IX and X were repeated except that the particular sulfosuccinates employed were bis(1,4-diethyl-heptyl) sulfosuccinate, bis(1,3-dialkylbutyl) sulfosuccinate, bis(3,5-dimethyl-octyl-5) sulfosuccinate, bis(1,7-diethyl tridecyl-10) sulfosuccinate, bis(1,3-dimethyl butyl-1) sulfosuccinate, bis(3,8-butyl heptyl-5) sulfosuccinate, and bis(1,7-diphenyl octyl-4) sulfosuccinate, etc. In each instance there was a dramatic improvement in both levelling and barrass effect when the sulfosuccinate was employed as compared to the process when said sulfosuccinate was not employed.

In the preceding examples the term “nylon” relates to the polyamide fiber obtained by condensing adipic acid with hexamethylenediamine, “nylon 610” denotes the polyamide fiber obtained by condensing sebacic acid with hexamethylenediamine, “nylon 66/6” is the polyamide copolymer obtained by condensing together adipic acid, hexamethylenediamine and caprolactam, “Perlon” is the polyamide fiber obtained from caprolactam and “Risan” that obtained from waminoacidic acid.

Furthermore, in the preceding examples and throughout the specification, all indicated percentages are based on the weight of the fibrous goods employed as indicated by OWF.

As noted in the above examples and throughout the specification there may be added an acid such as acetic acid toward the end of the dyeing process to complete the exhaustion of the dyestuffs. Furthermore, as previously noted the acidification may also be employed for similar purposes wherein barrass dyings are repaired by subsequent treatment. Preferably, acetic acid is employed in those processes which require acidification. In addition, however, other organic or inorganic acids can also be employed in the known manner, such acids including formic acid, acetic acid, hydrochloric acid, sulfuric acid, phosphoric, alkyl and aryl sulfonic acids, and their acidic salts such as ammonium sulfate and the like.

In addition, as previously noted some of the dying processes are operative after an initial treatment with alkalinizing materials. Those alkalinizing materials which may be employed include but are not limited to ammonium hydroxide and alkali metal salts of weak acids such as sodium acetate and the like.

What is claimed is:

1. A method of producing improved polycarbonamide fibrous dyings consisting essentially of treating polycarbonamide fibrous material with an aqueous medium comprising from 0.1-10 percent by weight based on the weight of the fibrous material of a water-soluble salt of a dialkyl sulfosuccinate containing from about 12 to about 40 carbon atoms, in the presence of an acid dye.

2. The method of claim 1 wherein the dialkyl sulfosuccinate is a bis-nonyl sulfosuccinate.

3. The method of claim 1 wherein the salt of a dialkyl sulfosuccinate is sodium bis-(2,6-dimethyl-heptyl-4) sulfosuccinate.

4. The process of claim 1 wherein the pH of the dye bath is about 3 to about 7.

5. The process of claim 2 wherein the pH of the dye bath is about 3 to about 7.

6. The process of claim 3 wherein the pH of the dye bath is about 3 to about 7.

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