

PATENT SPECIFICATION

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(54) AROMATIC SULPHONE LEVELLING AGENTS

(71) We, SANDOZ LTD., of 35 Lichtstrasse, 4000 Basle, Switzerland, a Swiss Body Corporate, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

5 This invention relates to phenylsulphone levelling agents, for use in dyeing of acid-dyeable synthetic fibres in loose form, as yarn or in other textile forms. 5

In the dyeing of synthetic fibres in the various forms occurring in textile manufacture, the affinity differences or "barriness" in the substrate, which may be of physical or chemical origin, need to be regularised to ensure that level dyeings are obtained. 10 For this purpose, use is made of assistants, known as levelling agents, which may be employed with the dyes in the dyeing medium, or may be applied prior to dyeing. 10

Phenyl sulphone levelling agents have previously been proposed. For example, U.K. Patent 1,177,246 discloses phenylsulphone levelling agents which are produced by condensation of diphenylether sulphonic acids and related compounds. However, anionic assistants of this type generally suffer the disadvantage of having diminishing effectiveness with increasing pH. There is need for assistants which remain effective at relatively high pH values, for example from 5 to 8. For example, if nylon carpets backed with jute are dyed at a pH value under 5 to 6, the natural colouring matter of the jute is absorbed by the nylon pile and stains the dyeing. This results in dyeings of dull shade having reduced fastness properties, for example to light. A further disadvantage of these known levelling agents is their pronounced surface activity. This leads to heavy foaming and may prevent the dyes from fully penetrating the substrate. 15 20

U.K. patent 1,177,246 also discloses sulphone levelling agents containing sulphononic acid groups, which are produced from phenolic compounds by means of sulphonation with sulphuric acid and condensation. These agents suffer the disadvantage that they may retard exhaustion of the dyes from the medium to the substrate, largely because of their high hydroxy content. 25

The present invention provides aromatic sulphone levelling agents which contain at least one sulphononic acid group or salt form thereof bound to a phenyl ring and which are obtainable by 30

a) sulphonation with sulphuric acid and at a temperature of from 80 to 150°C, of at least one of starting components comprising a component (i) comprising at least one aromatic phenolic compound containing from 6 to 20 carbon atoms and having at least one hydroxyl group bound to a phenyl ring, 35 and a component (ii) comprising at least one aromatic non-phenolic compound containing from 6 to 20 carbon atoms,

from 1 to 30% of component (i) and from 99 to 70% of component (ii), based on the total weight of components (i) and (ii), being employed, and removing water of sulphonation produced, 40

and

b) condensing the resulting sulphonation product together with any unsulphon-

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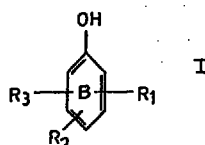
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ated components (i) and (ii), at a temperature of from 120° to 220°C, until the acid number of the mixture remains substantially constant,

and where a salt form is required, converting the resulting acid form into such salt form.

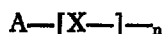
5 The invention also provides the above process for producing the levelling agents of the invention and a process for dyeing acid-dyeable synthetic fibres, yarns and textiles from aqueous medium and at a pH value of from 5 to 8, characterised in that the dyeing is effected in the presence of a levelling agent in accordance with the invention.

10 Suitable phenolic compounds for use as component (i) are compounds of formula I,



in which either R₁, R₂ and R₃ are the same or different and each signifies hydrogen, hydroxyl, halogen, carboxyl or a radical of formula II,

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II

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in which X signifies —O—, —S—, —SO—, —SO₂ or straight or branched chain, unsubstituted or substituted alkylene of 1 to 4 carbon atoms, n signifies 0 or 1, and

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A signifies unsubstituted or substituted alkyl of 1 to 4 carbon atoms, or unsubstituted or substituted phenyl or diphenyl, or R₁, R₂ and R₃ together with ring B may signify unsubstituted or substituted alicyclic or heterocyclic radicals,

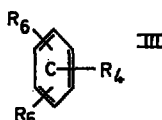
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provided that the compounds contain from 6 to 20 carbon atoms.

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Suitable non-phenolic compounds for use as component (ii) are compounds of formula III,

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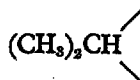
in which R₄, R₅, R₆ and ring C have the same significance as R₁, R₂, R₃ and ring B, defined above, except that none may signify or contain hydroxy,

provided that the compounds contain from 6 to 20 carbon atoms.

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When X signifies an alkylene radical, it preferably signifies the radical —CH₂—,

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or —CH₂—CH₂—. Suitable substituted alkylene radicals include halogen substituted alkylene radicals. When A signifies alkyl, it preferably signifies methyl, ethyl, *n*-propyl or iso-propyl and suitable substituted alkyl radicals include haloalkyl radicals. When A signifies a substituted phenyl radical, suitable substituents include halogen, carboxyl, radicals of formula II and, in the case of compounds of formula I, hydroxy. Where R₁, R₂ and R₃ or R₄, R₅ and R₆ combine with ring B or C to form an alicyclic or heterocyclic radical, suitable such radicals include those of naphthalene, anthracene, fluorene and dibenzofuran.

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As used herein, the term "halogen" means fluorine, chlorine, bromine or iodine, preferably chlorine.

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The preferred compounds of formula I include phenols, cresols, chlorophenols,

aromatic phenol carboxylic acids, phenylphenols, hydroxyphenyl ethers, hydroxydibenzofuran, hydroxydiphenylalkanes in which the alkane contains 1 to 4 carbon atoms and hydroxydiphenyl sulphones. Of these, phenol, 3-methylphenol, *o*-chlorophenol, salicylic acid, *o*-phenylphenol, *p*-phenylphenol, 4,4'-dihydroxydiphenyl-(2,2)-propane and 4,4'-dihydroxydiphenylsulphone are particularly preferred.

The preferred compounds of formula III include diphenyls, diphenyl ethers and sulphides and diphenylphenyl sulphides. Of these, diphenyl, diphenyl sulphide and diphenyl ether are particularly preferred. The action of the sulphones of the invention may also be modified by using as component (ii), in addition to the preferred compounds III mentioned above, for example fluorene, phenyltoluene, naphthalene, methyl naphthalene, dibenzofuran, isopropyl-diphenyl or mixtures thereof. Thus, component (ii) may, for example, comprise a mixture of 3 to 60% by weight of diphenyl, 5 to 35% by weight of phenyl-toluenes, 5 to 25% by weight of fluorene and 3 to 10% by weight of naphthalene/methyl-naphthalene.

In general, the weight ratio of component (ii) to component (i) is, for example from 80:20 to 97:3, preferably 85:15 to 95:5.

As will be appreciated, however, the relative quantities used will vary depending on the starting materials employed. Thus, for example, where a starting material of formula I which contains more than one hydroxy group is employed, relatively small quantities thereof may desirably be employed in order to give products having a low hydroxy content. A typical starting mixture may suitably comprise diphenyl ether, diphenyl or diphenyl sulphide and orthophenylphenol in a weight ratio of from 70:30 to 97:3, preferably 80:20 to 97:3, in particular 95:5.

The quantity of sulphuric acid used is suitably such as to result in final products which are easily stirrable. Per mole of the organic components (based on their average molecular weight), from 1 to 2, preferably 1.2 to 1.8 and in particular, 1.5 moles (based on 100 weight % sulphuric acid) of sulphuric acid is suitably used in step a). The sulphuric acid may suitably be from 90 weight % to 100 weight % concentration. Alternatively, 0 to 65% oleum may be employed.

As indicated, it is within the scope of the process of the invention to sulphonate both components (i) and (ii), either in admixture or separately, and then to condense the sulphonation products, if necessary after admixture, or to sulphonate only one of the components and then to mix this with the unsulphonated component and to then effect condensation. Furthermore, a proportion only of one or both of the starting components may be sulphonated, the remaining unsulphonated material being added before condensation. Alternatively, the sulphonation products of components (i) and (ii) may be condensed separately, the resulting products then being admixed. It is, however, preferred to sulphonate the entire mixture of components (i) and (ii).

In step a), the sulphuric acid is suitably added to the material to be sulphonated at the lowest practicable temperature. The sulphonation may then suitably be carried out at a temperature of from 100° to 130°C and is conveniently continued until a homogenous sulphonation mixture is obtained.

After sulphonation, the water of sulphonation is removed, for example by application of vacuum. The condensation in step b) is preferably effected at a temperature of from 150° to 190°C and, suitably, in the presence of a condensation catalyst, such as polyphosphoric acid. As indicated, the condensation is continued until the acid number of the mixture remains substantially constant. It is preferable to remove water produced by the condensation by effecting the condensation under reduced pressure or in the presence of an inert organic entrainment agent, e.g. dichlorobenzene. Alternatively, the water vapour may be removed by cooling under an inert gas stream, e.g. nitrogen or carbon dioxide.

Otherwise, the process of the invention may be carried out as described in U.K. patent 1,162,755.

The resulting sulphones may be converted into salt forms, preferably water-soluble salt forms, using conventional techniques. Suitable salt forms include alkali-metal, e.g. sodium or potassium, alkaline earth metal, e.g. magnesium and calcium, and ammonium salt forms and also salt forms with amines, such as methylamine, dimethylamine or hydroxyethylamine.

The resulting reaction products may be worked up by conventional techniques. For example, the product may, if desired after neutralisation, be diluted or dried, depending on the desired form of the final product. Generally speaking, the greater the content of hydroxyl groups in the final product, the more pronounced its retarding action upon dyes in the dyeing process. This effect can interfere with the desired action of the levelling agents although the effect may be utilised in producing levelling agents which reserve the nylon component of wool/nylon blends against dyes, which

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is sometimes required for fabric styling. In any event, the quantity of component (i) used is selected accordingly. However, the higher the quantity of component (i) employed, the greater is the need to take care to avoid formation of brownish by-products in the final phenylsulphones. These by-products tend to stain the fibre yellow in dyeing.

The products of the invention serve primarily to control the rate of exhaustion and the distribution of dyes of anionic character on the textile substrate. The term "dyes of anionic character" is intended to signify dyes which form coloured anions in aqueous solution, for example acid levelling dyes, milling dyes, 1:1 and 2:1 pre-metallised dyes, chrome, direct and reactive dyes.

The products of the invention are useful as levelling agents in dyeing acid-dyeable synthetic fibres, for example those produced from synthetic polymers which have been modified by the introduction of carbonamide groups or basic groups. Examples of such are the polyamides nylon 6, from caprolactam, and nylon 6:6 from hexamethylenediamine and adipic acid, and other polyamides produced from dihydric alcohols and dicarboxylic acids. Polyesters modified by introduction of carbonamide groups are examples of basic-modified fibres.

In the dyeing process, the levelling agents of the invention may suitably be employed in conjunction with non-ionic, anionic and/or cationic dyeing assistants. Particularly advantageous is the combined use of the products of the invention and polyglycol ethers, notably aminopolyglycol ethers such as the polyglycol ethers of fatty amines of aminopropyl tallow amine with about 6 to 150 moles of ethylene oxide, and their derivatives formed by partial quaternisation or esterification or etherification with acids. The polyether compounds are known and may be produced, for example, by condensation of the appropriate aliphatic amine, in particular long-chain primary alkylamines, such as fatty tallow amine, or of the amines formed by reaction of phenols, amines and formaldehyde, with alkylene oxides, such as ethylene oxide, propylene oxide, dodecene oxide or styrene oxide. The products produced may subsequently be reacted with quaternating agents such as methyl, ethyl or benzyl halides, dimethyl sulphate, epichlorhydrin, chloracetic acid or chloracetamide. Where adducts are formed, they may be reacted with multibasic acids such as sulphuric, phosphoric or maleic acids.

The products of the invention are suitably employed in amounts of from 0:1 to 10% based on the weight of the substrate. Where employed, polyglycol ethers may suitably be used in amounts of from 0.01 to 4% based on the weight of the substrate. The dyeing medium may contain further auxiliary agents, such as sodium sulphate, sodium phosphates and hexamethylene tetramine. Foam inhibitors may also be used.

The following Examples, in which parts and percentages are by weight and temperatures are in degrees Centigrade, illustrate the invention. The term "mval" means milligram equivalent.

Examples of the production of the phenyl sulphones

Sulphone 1

665 parts of diphenyl ether and 35 parts of orthophenyl phenol are heated to 30° with stirring to form an intimate mixture. Over 10 to 20 minutes, 606 parts of concentrated sulphuric acid are added, dropwise, under a nitrogen atmosphere, causing a temperature increase to about 65°. With continued stirring, the mixture is raised to 115° to 120° and sulphonated for 6 hours at this temperature. The water of sulphonation is eliminated by applying vacuum. At this point, the acid number of the anhydrous sulphonation mixture is 528 mval/100 g. It is stirred further at 3 mm Hg pressure and 160° until the acid number no longer changes. The acid number of the final product is 390 mval/100 g.

Sulphones 2, 3, 4, 5, 6, 7, 8, 9 and 10

The operating procedure for the production of the sulphones 2 to 10 is the same as that for sulphone 1, but the amounts and in some cases the nature of the starting products are different.

Sulphone 2

Starting products:

630 parts diphenyl ether
70 parts ortho-phenyl phenol
606 parts sulphuric acid

Acid number of the final product (a mixture of acid resins): 385 mval/100 g.

Starting products:

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Starting products:

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Starting products:

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Starting products:

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Sulphone 9

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A5

Further sulphones can be produced by the procedure given for sulphone 1 from

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the starting materials noted below; the molecular amounts of sulphuric acid are based on the average molecular weight of the mixture for sulphonation.

5	Sulphone 11 75% dipheyl ether 25% phenol 1.5 mols sulphuric acid	5
10	Sulphone 12 70% diphenyl ether 30% ortho-phenyl phenol 1.7 mols sulphuric acid	10
15	Sulphone 13 98% diphenyl ether 2% 3-hydroxydibenzofuran 1.4 mols sulphuric acid	15
20	Sulphone 14 85% diphenyl ether 15% 3-hydroxydibenzofuran 1.6 mols sulphuric acid	20
25	Sulphone 15 85% diphenyl ether 15% para-phenyl phenol 1.5 mols sulphuric acid	25
30	Sulphone 16 70% diphenyl ether 20% ortho-phenyl phenol 10% phenol 1.5 mols sulphuric acid	30
35	Sulphone 17 85% diphenyl ether 10% ortho-phenyl phenol 5% salicylic acid 1.5 mols sulphuric acid	35
40	Sulphone 18 99% diphenyl ether 1% 4,4'-dihydroxydiphenyl sulphone 1.5 mols sulphuric acid	40
45	Sulphone 19 98% diphenyl ether 2% bis-phenol A 1.5 mols sulphuric acid	45
50	Sulphone 20 90% diphenyl ether 8% 3-hydroxydibenzofuran 2% ortho-chlorophenol 1.5 mols sulphuric acid	50
55	Sulphone 21 85% diphenyl sulphide 10% ortho-phenyl phenol 5% para-cyclohexyl phenol 1.6 mols sulphuric acid	55
	Sulphone 22 90% diphenyl ether 6% ortho-phenyl phenol 4% anisole 1.4 mols sulphuric acid	

Sulphone mixture 23

85 parts of the unneutralized sulphone 1 are mixed with 15 parts of an aminopropyl tallow amine reacted with 150 mols of ethylene oxide. 50 parts of the mixture are diluted with 50 parts of water to give 100 parts of sulphone mixture 23.

5	Sulphone 24	5
	80% diphenyl ether	
	10% terphenyl	
	10% ortho-phenyl phenol	
	1.6 mols sulphuric acid	
10	Sulphone 25	10
	70% diphenyl ether	
	10% diphenyl	
	10% anthracene	
	10% 3-hydroxybenzofuran	
15	1.6 mols sulphuric acid	15
	Sulphone 26	
	75% diphenyl	
	25% ortho-phenyl phenol	
	1.5 mols sulphuric acid	

20	Examples of Dyeing Procedures	20
	Example 1	

A dye bath of 4000 parts of water is set with 0.35 parts of dye 1 (see Table 1), 3 parts of sodium dihydrogen phosphate and 6 parts of sulphone 1. It is of pH 6. At 50°, 100 parts of a nylon fabric of irregular affinity are entered into the dye bath. The bath is raised to 98°—100° over 45 minutes and the fabric dyed for 1 hour at this temperature. On removal it is rinsed and dried. A red-brown dyeing with good fastness properties is obtained, which is free from the heavy barriness that would arise from the affinity differences in the fabric if the phenyl sulphone of this invention were not present in the bath.

Equally good results are obtained when in place of sulphone 1 an equal amount of one of the sulphones 2 to 8 or 12 to 22 is employed.

Example 2

Dyeing procedure 1 is repeated with the 0.18 parts of dye 1 replaced by 0.25 parts of dye 2 shown in Table 1. With the aid of sulphone 1 a level dyeing is obtained. If the place of sulphone 1 is taken by one of the sulphones 9, 10, 11, 24, 25 or 26, the dyeing is of comparable quality.

Example 3

An aqueous bath of 3000 parts and pH 6 containing 4 parts of sodium dihydrogen phosphate and 2 parts of sulphone 1 is prepared. 100 parts of a nylon carpet with jute backing (60% nylon pile on the total weight) are entered and treated for about 20 minutes at 40° with constant agitation, after which time 0.2 parts of dye 3 (Table 1) are added. The dye bath is brought to the boil over 45 minutes and the carpet dyed for 1 hour at this temperature. The procedure results in a level dyeing with a bright red shade uncontaminated by natural colouring matter from the jute and with good fastness properties.

Example 4

An aqueous dye bath of 5000 parts is prepared with additions of 0.40 parts of dye 4, 0.05 parts of dye 3 and 0.08 parts of dye 5 (see Table 1), 2 parts of sulphone 1 and 0.2 parts of the reaction product of aminopropyl behenylamine with 120 mols of ethylene oxide (product AM). The bath is adjusted to pH 6 with monosodium phosphate and disodium phosphate. At about 40—50°, 100 parts of a knitted fabric of textured nylon 6 yarn are entered, the bath is brought to the boil in 30—45 minutes and the fabric dyed for 1 1/2 hours at this temperature. After the bath has cooled it is removed, rinsed and dried. A level dyeing showing good fastness properties is obtained.

A dyeing of comparable quality is obtained when the reaction product of di-isooctyl phenol with 40 mols of ethylene oxide, carboxymethoxylated to 80% with ClCH_2COOH , is used in place of product AM. Dyeing is equally successful when

carried out with 4 parts of sulphone 24 in place of the combination of sulphone 1 and product AM.

Example 5

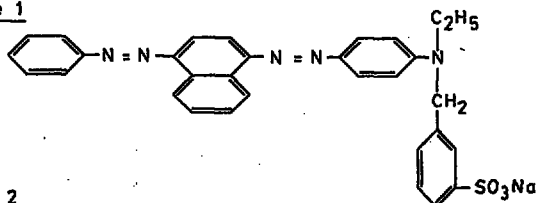
5 Dyeing procedure 1 is again repeated using sulphone 1, but without the addition of sodium dihydrogen phosphate, which means that the bath pH is 7. The resulting dyeing is level and has good fastness properties. 5

Example 6

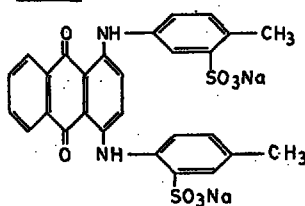
10 An aqueous dyebath of 5000 parts is made up with 0.25 parts of dye 1 (see Table 1), 5 parts of sodium dihydrogen phosphate and 10 parts of sulphone 15. The bath pH is 6. Into the bath, are entered, at 40—50°, 100 parts of a nylon fabric which, owing to affinity differences, would normally be dyed barry. The temperature is raised to 98—100° over 45 minutes and the fabric dyed for 1 hour at this temperature. On removal, it is rinsed and dried. The dyeing is free from barriness, showing a level red-brown shade, and has good fastness properties. A sample of wool 15 yarn entered into the bath after the process to ascertain the amount of unexhausted dye is only lightly stained. 15

TABLE 1

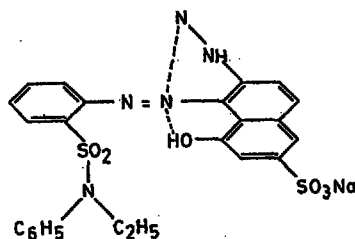
Dye 1



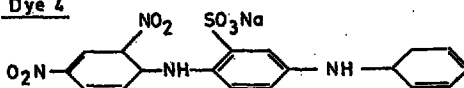
Dye 2



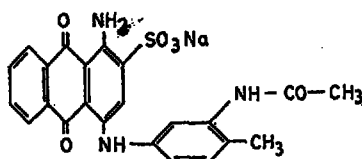
Dye 3



Dye 4



Dye 5.



WHAT WE CLAIM IS:—

25 1. A process for the production of aromatic sulphone levelling agents which contain at least one sulphonic acid group bound to a phenyl ring, characterised by 25



carried out with 4 parts of sulphone 24 in place of the combination of sulphone 1 and product AM.

Example 5

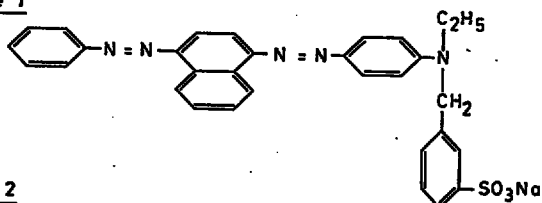
Dyeing procedure 1 is again repeated using sulphone 1, but without the addition of sodium dihydrogen phosphate, which means that the bath pH is 7. The resulting dyeing is level and has good fastness properties.

Example 6

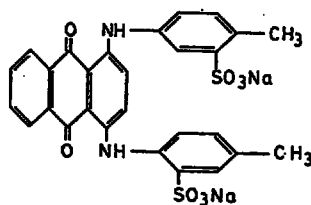
An aqueous dyebath of 5000 parts is made up with 0.25 parts of dye 1 (see Table 1), 5 parts of sodium dihydrogen phosphate and 10 parts of sulphone 15. The bath pH is 6. Into the bath, are entered, at 40—50°, 100 parts of a nylon fabric which, owing to affinity differences, would normally be dyed barry. The temperature is raised to 98—100° over 45 minutes and the fabric dyed for 1 hour at this temperature. On removal, it is rinsed and dried. The dyeing is free from barriness, showing a level red-brown shade, and has good fastness properties. A sample of wool yarn entered into the bath after the process to ascertain the amount of unexhausted dye is only lightly stained.

TABLE 1

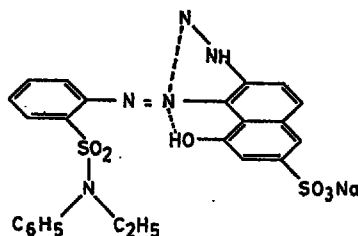
Dye 1



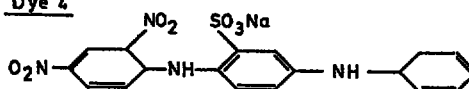
Dye 2



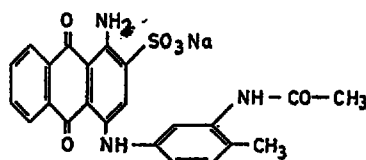
Dye 3



Dye 4



Dye 5.



WHAT WE CLAIM IS:—

1. A process for the production of aromatic sulphone levelling agents which contain at least one sulphonic acid group bound to a phenyl ring, characterised by



* C L N S *

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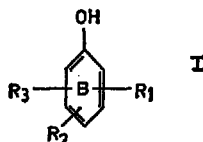
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- a) sulphonation with sulphuric acid and at a temperature of from 80 to 150°C, of at least one of starting components comprising
a component (i) comprising at least one aromatic phenolic compound containing from 6 to 20 carbon atoms and having at least one hydroxyl group bound to a phenyl ring,
and a component (ii) comprising at least one aromatic, non-phenolic compound containing from 6 to 20 carbon atoms,

from 1 to 30% of component (i) and from 99 to 70% of component (ii), based on the total weight of components (i) and (ii), being employed, and removing water of sulphonation produced, and

- b) condensing the resulting sulphonation product together with any unsulphonated components (i) and (ii), at a temperature of from 120° to 220°C, until the acid number of the mixture remains substantially constant.

2. A process according to claim 1, in which component (i) comprises a compound of formula I,

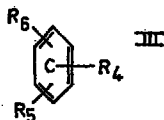


in which either R₁, R₂ and R₃ are the same or different and each signifies hydrogen, hydroxyl, halogen, carboxyl or a radical of formula II,



II

in which X signifies —O—, —S—, —SO—, —SO₂ or straight or branched chain, unsubstituted or substituted alkylene of 1 to 4 carbon atoms, n signifies 0 or 1, and A signifies unsubstituted or substituted alkyl of 1 to 4 carbon atoms, or unsubstituted or substituted phenyl or diphenyl,
or R₁, R₂ and R₃ together with ring B may signify unsubstituted or substituted alicyclic or heterocyclic radicals, provided that the compounds contain from 6 to 20 carbon atoms, and component (ii) comprises a compound of formula III,



in which R₄, R₅, R₆ and ring C have the same significance as R₁, R₂, R₃ and ring B, defined above, except that none may signify or contain hydroxy, provided that the compounds contain from 6 to 20 carbon atoms.

3. A process according to claim 2, in which in the compounds of formula I and III, R₁, R₂ and R₃ and R₄, R₅ and R₆ each signifies hydrogen, halogen, hydroxy, carboxyl or a radical of formula II, stated in claim 2, in which X signifies —O—, —S—, —SO—, —SO₂—, unsubstituted, straight or branched chain alkylene of 1 to 4 carbon atoms or straight or branched chain haloalkylene of 1 to 4 carbon atoms, n signifies 0 or 1 and A signifies alkyl of 1 to 4 carbon atoms, haloalkyl of 1 to 4 carbon atoms, phenyl, halophenyl, carboxyphenyl, or hydroxyphenyl or diphenyl, provided that none of R₄, R₅ and R₆ signify or contain hydroxy.

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4. A process according to claim 2, in which the compound of formula I is selected from phenols, cresols, chlorophenols, phenol carboxylic acids, phenylphenols, hydroxyphenyl ethers, hydroxydibenzofuran, hydroxydiphenyl alkanes in which the alkane contains 1 to 4 carbon atoms, and hydroxydiphenyl sulphones, and the compound of formula III, is selected from diphenyls, diphenyl ethers, diphenyl sulphides and diphenylphenyl sulphides. 5
5. A process according to claim 2, in which the compound of formula I is selected from phenol, 3-methylphenol, *o*-chlorophenol, salicylic acid, *o*-phenylphenol, *p*-phenylphenol, 4,4'-dihydroxy-diphenyl-(2,2)-propane and 4,4'-dihydroxy diphenylsulphone and the compound of formula III is selected from diphenyl, diphenylsulphide and diphenyl ether. 10
6. A process according to claim 2, in which the component (i) is ortho-phenylphenol and component (ii) is selected from diphenylether, diphenyl and diphenyl sulphide. 15
7. A process according to any one of claims 1 to 5, in which the weight ratio of component (ii) to component (i) is from 80:20 to 97:3. 15
8. A process according to claim 7, in which the weight ratio of component (ii) to component (i) is from 85:15 to 95:5.
9. A process according to claim 6, in which the weight ratio of component (ii) to component (i) is from 70:30 to 97:3. 20
10. A process according to claim 9, in which the weight ratio of component (ii) to component (i) is from 80:20 to 97:3.
11. A process according to claim 10, in which the weight ratio of component (ii) to component (i) is 95:5.
12. A process according to any one of the preceding claims, in which step a) is carried out on a mixture of components (i) and (ii), the resulting sulphonation products being admixed before effecting step b). 25
13. A process according to any one of claims 1 to 11, in which step a) is carried out separately on components (i) and (ii), the resulting sulphonation products being admixed before effecting step b). 30
14. A process according to any one of claims 1 to 11, in which step a) is carried out on only one of components (i) and (ii), the other component being admixed with the resulting product before effecting step b).
15. A process according to any one of claims 1 to 11, in which steps a) and b) are carried out separately on components (i) and (ii), the resulting products being admixed. 35
16. A process according to any one of the preceding claims, in which from 1 to 2 moles of sulphuric acid, based on 100% sulphuric acid, are employed per mole, based on average molecular weight, of components (i) and (ii).
17. A process according to claim 16, in which from 1.2 to 1.8 moles of sulphuric acid are employed. 40
18. A process according to any one of the preceding claims in which the sulphonation in step a) is effected at a temperature of from 100° to 130°C and the condensation in step b) is effected at a temperature of from 150° to 190°C.
19. A process according to any one of the preceding claims, in which the water of sulphonation produced is removed under vacuum. 45
20. A process according to any one of the preceding claims, substantially as herein described with reference to any one of the Examples.
21. An aromatic sulphone levelling agent, whenever produced by a process according to any one of the preceding claims. 50
22. An aromatic sulphone levelling agent obtainable by a process according to any one of claims 1 to 20.
23. An aromatic sulphone levelling agent according to claim 21 or 22, in the form of a water-soluble salt.
24. An aromatic sulphone levelling agent according to claim 21 or 22, in the form of a salt selected from an alkali metal, alkaline earth metal and ammonium salts and salts with methylamine, dimethylamine and hydroxyethylamine. 55
25. A process for dyeing acid-dyeable synthetic fibres, yarns and textiles from aqueous medium and at a pH value of from 5 to 8, characterised by dyeing in the presence of an aromatic sulphone levelling agent according to any one of claims 21 to 24. 60
26. A process according to claim 25, in which the synthetic fibre, yarn or textile is a polyamide, or a polyester modified by introduction of carbonamide groups.



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27. A process according to claim 25, in which the synthetic fibre, yarn or textile is nylon.

28. Acid-dyeable synthetic fibres, yarns or textiles whenever dyed by a process according to any one of claims 25 to 27.

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