CLAIMS

[Claim 1]

Bis(6-methyl-3-sulphophenyl)(2-methylphenyl)phosphine.

[Claim 2]

A bis(6-methyl-3-sulphonatophenyl)(2-methylphenyl)phosphine diammonium salt obtained by reacting the bis(6-methyl-3-sulphophenyl)(2-methylphenyl)phosphine according to claim 1 with a tertiary amine having a total of 3 to 27 carbon atoms in groups bonded to one nitrogen atom.

[Claim 3]

The bis(6-methyl-3-sulphonatophenyl)(2-methylphenyl)phosphine diammonium salt according to claim 2, wherein the tertiary amine is trimethylamine, triethylamine, tripropylamine, triisopropylamine, tributylamine, triisobutylamine, tri-s-butylamine, tri-t-butylamine, tripentylamine, triisopentylamine, trineopentylamine, trihexylamine, triheptylamine, trioctylamine, triphenylamine, tribenzylamine, N,N-dimethylethylamine, N,N-dimethylpropylamine, N,N-dimethylisopropylamine, N,N-dimethylbutylamine, N,N-dimethylisobutylamine, N,N-dimethyl-s-butylamine, N,N-dimethyl-t-butylamine, N,N-dimethylpentylamine, N,N-dimethylisopentylamine, N,N-dimethylneopentylamine, N,N-dimethylhexylamine, N,N-dimethylheptylamine, N,N-dimethyloctylamine, N,N-dimethylnonylamine, N,N-dimethyldecylamine, N,N-dimethylundecylamine, N,N-dimethyldodecylamine, N,N-dimethylphenylamine, N,N-dimethylbenzylamine, N,N-diethylmonomethylamine, N,N-dipropylmonomethylamine, N,N-diisopropylmonomethylamine, N,N-dibutylmonomethylamine, N,N-diisobutylmonomethylamine, N,N-di-s-butylmonomethylamine, N,N-di-t-butylmonomethylamine, N,N-dipentylmonomethylamine, N,N-diisopentylmonomethylamine, N,N-dineopentylmonomethylamine, N,N-dihexylmonomethylamine, N,N-diheptylmonomethylamine, N,N-dioctylmonomethylamine, N,N-dinonylmonomethylamine, N,N-didecylmonomethylamine, N,N-diundecylmonomethylamine, N,N-didodecylmonomethylamine, N,N-diphenylmonomethylamine, N,N-dibenzylmonomethylamine, N,N-dipropylmonomethylamine, N,N-diisopropylmonoethylamine, N,N-dibutylmonoethylamine, N,N-diisobutylmonoethylamine, N,N-di-s-butylmonoethylamine, N,N-di-t-butylmonoethylamine, N,N-

dipentylmonoethylamine, N,N-diisopentylmonoethylamine, N,N-dineopentylmonoethylamine, N,N-dihexylmonoethylamine, N,N-diheptylmonoethylamine, N,N-dioctylmonoethylamine, N,N-dinonylmonoethylamine, N,N-didecylmonoethylamine, N,N-diundecylmonoethylamine, N,N-didodecylmonoethylamine, N,N-diphenylmonoethylamine, N,N-dibenzylmonoethylamine, or trinonylamine.

[Claim 4]

A mixture comprising 5% by mole or less of bis(2-methylphenyl)(6-methyl-3-sulphophenyl)phosphine, 80% by mole or more of bis(6-methyl-3-sulphophenyl)(2-methylphenyl)phosphine, and 15% by mole or less of tris(6-methyl-3-sulphophenyl)phosphine.

[Claim 5]

A mixture comprising 80% by mole or more of a bis(6-methyl-3-sulphonatophenyl)(2-methylphenyl)phosphine diammonium salt obtained by reacting the mixture according to claim 4 with a tertiary amine having a total of 3 to 27 carbon atoms in groups bonded to one nitrogen atom.

[Claim 6]

A method for producing bis(6-methyl-3-sulphophenyl)(2-methylphenyl)phosphine, comprising:

a step of reacting 2.5 moles to 4.5 moles of sulphur trioxide with 1 mole of tris(2-methylphenyl)phosphine in the presence of concentrated sulphuric acid to obtain a sulphonation reaction liquid, and diluting the obtained sulphonation reaction liquid with water to obtain a diluted liquid;

a step of neutralizing the diluted liquid with an alkali metal hydroxide; and

a step of bringing the aqueous solution obtained in the neutralization step into contact with a strongly acidic cation exchange resin.

[Claim 7]

A method for producing a bis(6-methyl-3-sulphonatophenyl)(2-methylphenyl)phosphine diammonium salt by reacting bis(6-methyl-3-sulphophenyl)(2-methylphenyl)phosphine with a tertiary amine having a total of 3 to 27 carbon atoms in groups bonded to one nitrogen atom.

CLAIMS

[Claim 1]

A bis(6-methyl-3-sulphonatophenyl)(2-methylphenyl)phosphine diammonium salt obtained by reacting the bis(6-methyl-3-sulphophenyl)(2-methylphenyl)phosphine with a tertiary amine having a total of 5 to 10 carbon atoms in groups bonded to one nitrogen atom.

[Claim 2]

The bis(6-methyl-3-sulphonatophenyl)(2-methylphenyl)phosphine diammonium salt according to claim 1, wherein the tertiary amine is triethylamine, or N,N-dimethylisopropylamine.

[Claim 3]

A mixture comprising 80% by mole or more of a bis(6-methyl-3-sulphonatophenyl)(2-methylphenyl)phosphine diammonium salt obtained by reacting the mixture comprising 5% by mole or less of bis(2-methylphenyl)(6-methyl-3-sulphophenyl)phosphine, 80% by mole or more of bis(6-methyl-3-sulphophenyl)(2-methylphenyl)phosphine, and 15% by mole or less of tris(6-methyl-3-sulphophenyl)phosphine with a tertiary amine having a total of 5 to 10 carbon atoms in groups bonded to one nitrogen atom.

[Claim 4]

A method for producing bis(6-methyl-3-sulphophenyl)(2-methylphenyl)phosphine, comprising:

a step of reacting 2.5 moles to 4.5 moles of sulphur trioxide with 1 mole of tris(2-methylphenyl)phosphine in the presence of concentrated sulphuric acid to obtain a sulphonation reaction liquid, and diluting the obtained sulphonation reaction liquid with water to obtain a diluted liquid;

a step of neutralizing the diluted liquid with an alkali metal hydroxide; and

a step of bringing the aqueous solution obtained in the neutralization step into contact with a strongly acidic cation exchange resin.

[Claim 5]

A method for producing a bis(6-methyl-3-sulphonatophenyl)(2-

methylphenyl)phosphine diammonium salt by reacting bis(6-methyl-3-sulphophenyl)(2-methylphenyl)phosphine produced by the method according to claim 4 with a tertiary amine having a total of 3 to 27 carbon atoms in groups bonded to one nitrogen atom.

[Claim 6]

The method according to Claim 5, wherein the tertiary amine has a total of 5 to 10 carbon atoms in groups bonded to one nitrogen atom.