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mit beschränkter Haftung

Tetrahydroquinazolines, a process for their manufacture,
liquid-crystalline dielectrics containing these, and an
electro-optical display element

The properties of nematic or nematic-cholesteric
5 liquid-crystalline materials are increasingly utilised
for electro-optical display elements in order to effect
significant changes in the optical properties of the
latter, such as light absorption, light scattering,
birefringence, reflectance or colour, under the influence
10 of electric fields. The functioning of display ele-
ments of this type is based here, for example, on the
phenomena of dynamic scattering, the deformation of align-
ed phases, the Schadt-Helfrich effect in the twisted cell
or the cholesteric-nematic phase transition.

15 For the technical application of these effects
in electronic components, liquid-crystalline dielectrics
are required which must fulfil a large number of
requirements. The chemical resistance to moisture,
air and physical influences, such as heat, radiation in
20 the infrared, visible and ultraviolet ranges and
continuous and alternating electric fields, is here of
particular importance. Industrially usable liquid-
crystalline dielectrics are also required to have a
liquid-crystalline mesophase in the temperature range
25 from at least $+10^{\circ}\text{C}$ to $+50^{\circ}\text{C}$, preferably from 0° to

60°C, and the lowest possible viscosity at room temperature, which preferably should not exceed 70×10^{-3} Pa.s. Finally, they must not have any characteristic absorption in the range of visible light, that is to say they must be colourless.

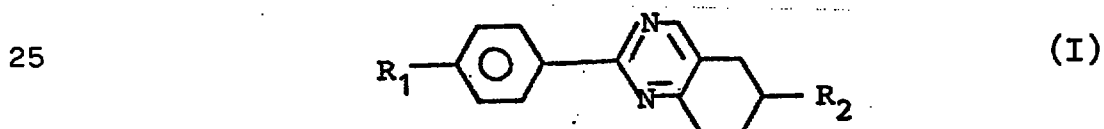
A number of liquid-crystalline compounds has already been disclosed, which fulfil the stability demands made for dielectrics intended for electronic components, and which are also colourless. These include, in particular, the p,p'-disubstituted phenyl benzoates described in German Offenlegungsschrift 2,139,628 and the p,p'-disubstituted phenylcyclohexane derivatives described in German Offenlegungsschrift 2,636,684. In the two classes of compounds mentioned, and also in other known series of compounds with a liquid-crystalline mesophase, there are no individual compounds which form a liquid-crystalline nematic mesophase in the required temperature range from 10°C to 60°C. As a rule, mixtures of two or more compounds are therefore prepared, in order to obtain substances which can be used as liquid-crystalline dielectrics. For this purpose, a compound having a low melting point and clear point is usually mixed with another compound having a markedly higher melting point and clear point. This normally gives a mixture, the melting point of which is below that of the lower-melting component, whilst the clear point is between the clear points of the components. It is, however, not easy to prepare optimum dielectrics in this way,

since the components having the high melting points and clear points frequently also impart a high viscosity to the mixtures. As a result, the switching times of the electro-optical display elements, produced with these mixtures, are extended in an undesirable manner.

Moreover, German Offenlegungsschriften 2,257,588 and 2,547,737 have already disclosed liquid-crystalline compounds from the phenylpyrimidine series, that is to say compounds with hetero-aromatic rings each containing 2 nitrogen atoms. It has been found, however, that these compounds possess only liquid-crystalline mesophases of very high viscosity and, even in mixtures with other liquid crystals, induce a viscosity which is unduly high for wide application as a dielectric in electro-optical display elements. This applies to a particular degree if components raising the clear point are also used additionally in such dielectrics.

It is the object of the invention to prepare liquid-crystalline dielectrics which have a nematic phase within the required temperature range and, in liquid crystal cells, make switching times possible, which are sufficiently short at room temperature.

It has now been found that the tetrahydroquinazolines of the formula (I)



wherein R_1 denotes alkyl, alkoxy, alkanoyloxy or alkoxy-

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carbonyloxy with up to 8, preferably up to 6, carbon atoms in each case, CN, CF₃, halogen or NO₂ and R₂ denotes alkyl having up to 10 carbon atoms, are outstandingly suitable as components of liquid-crystalline dielectrics. They are

5 used here in particular for widening the temperature range of the nematic phase, because they have high clear points in conjunction with melting points which are surprisingly low for this type of structure.

Moreover, the compounds of the formula (I) have a posi-

10 tive dielectric anisotropy (DCA) which is more or less pronounced, depending on the nature of the wing groups R₁ and R₂. The compounds of the formula (I) are therefore used above all for modifying the DCA of liquid-crystalline dielectrics; in particular, the compounds of

15 the formula (I), in which R₁ is a polar group, such as CN, CF₃, halogen or NO₂, have an astonishingly high positive DCA and are therefore preferentially employed in those dielectrics which are used for electro-optical display elements based on the principle of the twisted

20 nematic cell (TNC) or the cholesteric-nematic phase transition; in display elements of this type, they make it possible to render information visible, with very low threshold voltages or operating voltages.

In the pure state, the compounds of the formula

25 (I) are colourless and chemically and photochemically very stable and, alone, or in combination with other liquid-crystalline substances, they form nematic mesophases having an astonishingly low viscosity.

The invention thus relates to the tetrahydro-

quinazolines of the formula (I), to their manufacture and to their use as components of liquid-crystalline dielectrics. Furthermore, the invention relates to liquid-crystalline dielectrics having a content of at least one tetrahydroquinazoline of the formula (I) and to electro-optical display elements which are based on a liquid crystal cell and contain a liquid-crystalline dielectric of this type.

In the compounds according to the invention, the alkyl groups which represent the wing groups R_2 and if appropriate R_1 , or the alkyl parts of the alkoxy, alkanoyloxy or alkoxycarbonyloxy groups representing the wing group R_1 , can be straight-chain or branched. In every case, however, the compounds according to the invention contain at most only one branched alkyl group; amongst the compounds according to the invention having 2 chain-type wing groups, however, those are preferred in which these two wing groups have straight chains, because the compounds as a rule then have markedly higher clear points. Compounds according to the invention, of the formula (I), having a branched wing group R_1 or R_2 are occasionally important because of a higher solubility in the conventional liquid-crystalline base materials, but particularly as chiral doping substances if they possess optical activity due to the chain branching. Such branched substituents do not contain more than one chain branching. Preferred branched radicals are those in which a methyl or ethyl group is located in the 2- or 3-position on a rela-

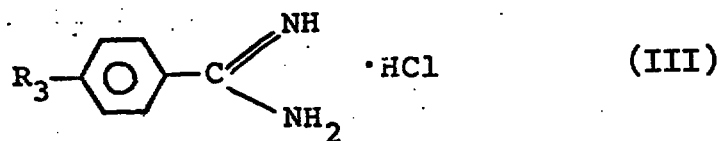
tively long carbon chain, for example 2-methylpropyl, 2-methylbutyl, 3-methylbutyl, 2-methylpentyl, 3-methylpentyl, 2-ethylhexyl or 2-methylhexyl. According to the definition, the wing groups of the compounds according to the invention can together contain up to 18 carbon atoms. Amongst these, those compounds are preferred in which the wing groups together contain 2 to 14, in particular 3 to 12, carbon atoms.

If the wing group R_1 denotes halogen, CF_3 , NO_2 or preferably CN, the compounds according to the invention, characterised in this way, have a particularly strongly pronounced positive DCA which reaches values of up to +35. Compounds from this group are preferentially used for increasing the DCA, for example in place of 4-dimethylaminobenzonitrile which is employed for this purpose according to German Patent Specification 2,321,632.

The compounds according to the invention are prepared in a manner which is conventional for substances of this type, for example by reacting a 4-alkyl-2-hydroxymethylene-cyclohexanone of the formula (II)



wherein R_2 denotes an alkyl group having up to 10 carbon atoms, with a benzamidine hydrochloride of the formula (III)

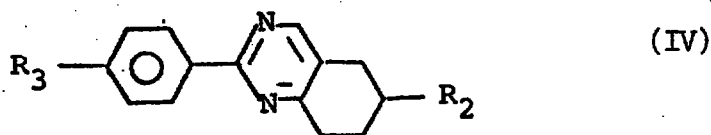


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in the presence of a basic condensation agent. The radical R_3 therein has the meaning of those groups indicated for R_1 in the formula (I), which are stable under the conditions of condensation reactions of this type, that is to say in particular alkyl, alkoxy, halogen or NO_2 . Moreover, the radical R_3 can also represent other groups which are stable under these conditions and which can readily be converted into other radicals R_1 , particularly the benzyloxy group, for example. Suitable basic condensation agents for the process according to the invention are, for example, alkali metal alcoholates or alkali metal hydroxides in alcohols, and also organic bases, such as, for example, piperidine in alcohol or pyridine. Preferably, sodium methylate or sodium ethylate in methanol or ethanol respectively are used. The reaction is carried out at a temperature between 20° and 120° , preferably in boiling methanol or ethanol. Under these conditions, the reaction is complete, as a rule, after 1 - 10 hours. The reaction mixture is worked up in a manner which is conventional per se, usually by evaporation, taking-up in water and extraction of the resulting tetrahydroquinazoline with ether.

The conversion, which may follow, of an undesired radical R_3 into a desired radical R_1 is carried out under the conditions usual for reactions of this type. Thus, for example,

25 2-(p-benzyloxyphenyl)-tetrahydroquinazolines (formula IV, R_3 = benzyloxy)

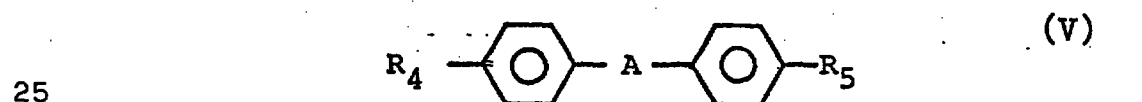


are hydrolytically or hydrogenolytically split to the corresponding 2-(p-hydroxyphenyl)-tetrahydroquinazolines

and are then converted by means of an alkanoyl chloride or alkoxycarbonyl chloride into compounds of the formula (I) in which R_1 denotes alkanoyloxy or alkoxycarbonyloxy. By reacting a compound of the formula (IV) in which R_3 denotes halogen, for example bromine, with copper-(I) cyanide in N-methylpyrrolidone, the halogen atom is exchanged for the nitrile group and thus the 2-(p-cyanophenyl)-tetrahydroquinazolines of the formula (I) are prepared. In turn, the 2-(p-trifluoromethylphenyl)-tetrahydroquinazolines according to the invention are obtained from the cyano compounds by saponification to the corresponding carboxylic acids and reaction of the latter with sulphur tetrafluoride.

The liquid crystalline dielectrics according to the invention consist of two or more components, including at least one of the formula (I). The other components are preferably nematic or nematogenic substances from the classes of azobenzenes, azoxybenzenes, biphenyls, Schiff bases, in particular benzylidene derivatives, phenyl benzoates, phenylpyrimidines, phenylcyclohexanes, optionally halogenated stilbenes, diphenylacetylene derivatives, diphenylnitrones and substituted cinnamic acids.

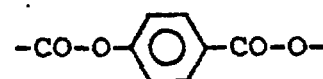
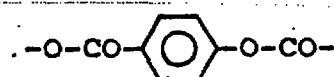
The most important compounds which can be used as such further components, can be characterised by the formula (V):



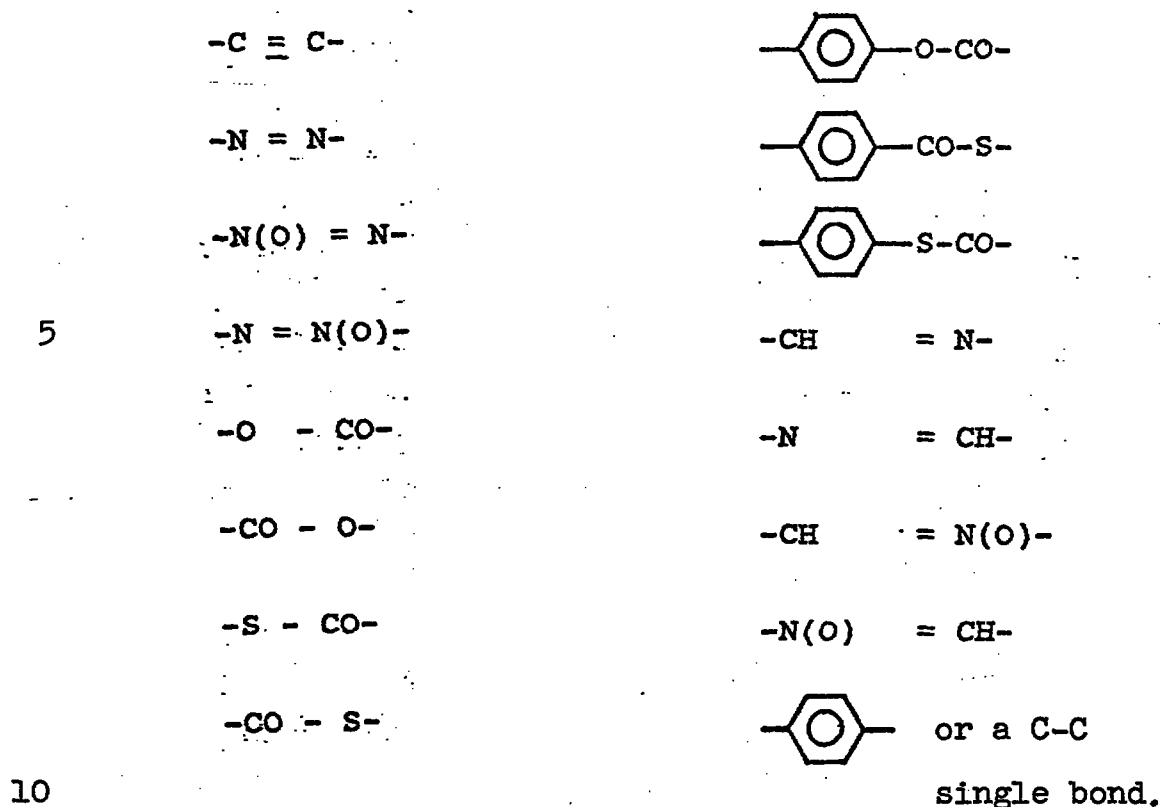
wherein A denotes $-\text{CH} = \text{CH}-$

$-\text{CX}' = \text{CH}-$

$-\text{CH} = \text{CX}'-$



(B)



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Further possible components of the dielectrics according to the invention are those compounds of the formula (V) in which one or more phenyl rings are replaced by a corresponding number of trans-cyclohexyl rings; one of
 15 these rings can also be a 2,5-disubstituted pyrimidine ring.

X' denotes halogen, preferably Cl, or $-CN$; R_5 and R_4 are identical or different and can denote alkyl, alkoxy, alkanoyl, alkanoyloxy or alkoxycarbonyloxy
 20 radicals having up to 18, preferably up to 8, C atoms; moreover, one of these radicals can also denote $-CN$, $-NC$, NO_2 , CF_3 or halogen.

In most of these compounds, R_5 and R_4 are preferably different, one of the radicals denoting an
 25 alkyl or alkoxy group in most cases. A large

number of other variants of the envisaged substituents, however, are also common. Many such substances are commercially available.

The dielectrics according to the invention contain as a rule at least 30, preferably 50 - 99, in particular 60 - 98, parts by weight of the compounds of the formula (I) and (V). Of this, preferably 5 - 50 parts by weight, in particular 10 - 30 parts by weight, account for one or more compounds of the formula (I). The invention also comprises those liquid-crystalline dielectrics to which only less than 5 parts by weight, for example 0.1 to 3 parts by weight, of one or more compounds of the formula (I) have been added, for example for doping purposes.

The preparation of the dielectrics according to the invention is carried out in a manner conventional per se. As a rule, the desired quantity of the components used in a smaller quantity is dissolved in the components representing the main constituent, advantageously at elevated temperature. If a temperature above the clear point of the main constituent is chosen for this, the completeness of the solution process can be observed with particular ease.

It is also possible, however, to mix solutions of the components of the formula (I) and (V) in a suitable organic solvent, for example acetone, chloroform or methanol, and, after thorough mixing, to remove the solvent again, for example by distillation under reduced pressure. Of course, it is necessary in this

procedure to take care that no impurities or undesired doping substances are introduced by the solvent.

The liquid-crystalline dielectrics according to the invention can be modified by suitable additives in such a way that they can be used in all hitherto disclosed types of liquid crystal display elements. Additives of this type are known to those skilled in the art and are extensively described in the relevant literature. For example, substances can be added for varying the viscosity, the conductivity and/or the orientation of the nematic phases. Substances of this type are described, for example, in German Offenlegungsschriften 2,209,127, 2,338,281, 2,450,088, 2,548,360 and 2,637,430.

The examples which follow are intended to explain the invention without restricting it. In the examples, m.p. denotes the melting point, and c.p. denotes the clear point, of a liquid-crystalline substance in degrees Centigrade; boiling points are marked b.p. Unless otherwise stated, parts or percentage figures denote parts by weight or per cent by weight.

Example 1

2.46g of 4-n-hexyl-2-hydroxymethylene-cyclohexanone and 3.1 g of 4-n-butoxy-benzamidine hydrochloride are added one after the other to a solution of 0.3 g of sodium in 14 ml of ethanol and the reaction mixture is heated to the boil for 4 hours, with stirring. Subsequently, the ethanol is distilled off, 50 ml of water are added to the residue and the aqueous

reaction mixture is extracted with twice 50 ml of diethyl ether. The extracts are dried over sodium sulphate and evaporated. The remaining 2-(4-n-butoxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline is recrystallised from ethanol; yield 2.2 g, m.p. 73°, c.p. 105°.

The following are prepared analogously:

- 2-(4-Methylphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methylphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,

2-(4-Methylphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,

2-(4-Ethylphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,

5 2-(4-Ethylphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Ethylphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,

2-(4-Ethylphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,

10 2-(4-Ethylphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,

2-(4-Ethylphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,

2-(4-Ethylphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
15 line,

2-(4-Ethylphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,

2-(4-Ethylphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,

20 2-(4-Ethylphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,

2-(4-Ethylphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,

2-(4-Ethylphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
25

2-(4-n-Propylphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,

- 2-(4-n-Propylphenyl)-6-ethyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Propylphenyl)-6-n-propyl-5,6,7,8-tetrahydro-
quinazoline,
- 5 2-(4-n-Propylphenyl)-6-n-butyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Propylphenyl)-6-n-pentyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Propylphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquina-
10 zoline,
- 2-(4-n-Propylphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Propylphenyl)-6-n-octyl-5,6,7,8-tetrahydroquina-
zoline,
- 15 2-(4-n-Propylphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Propylphenyl)-6-n-decyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Propylphenyl)-6-(2-methylbutyl)-5,6,7,8-tetra-
20 hydroquinazoline,
- 2-(4-n-Propylphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetra-
hydroquinazoline,
- 2-(4-n-Butylphenyl)-6-methyl-5,6,7,8-tetrahydroquinazo-
25 line,
- 2-(4-n-Butylphenyl)-6-methyl-5,6,7,8-tetrahydroquinazo-
line (sic),
- 2-(4-n-Butylphenyl)-6-n-propyl-5,6,7,8-tetrahydroquina-
zoline,

- 2-(4-n-Butylphenyl)-6-n-butyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Butylphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquina-
zoline,
- 5 2-(4-n-Butylphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Butylphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Butylphenyl)-6-n-octyl-5,6,7,8-tetrahydroquina-
10 zoline,
- 2-(4-n-Butylphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Butylphenyl)-6-n-decyl-5,6,7,8-tetrahydroquina-
zoline,
- 15 2-(4-n-Butylphenyl)-6-(2-methylbutyl)-5,6,7,8-tetra-
hydroquinazoline,
- 2-(4-n-Butylphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetra-
hydroquinazoline,
- 20 2-(4-n-Pentylphenyl)-6-methyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Pentylphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazo-
line,
- 2-(4-n-Pentylphenyl)-6-n-propyl-5,6,7,8-tetrahydroquina-
25 zoline,
- 2-(4-n-Pentylphenyl)-6-n-butyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Pentylphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquina-
zoline,

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- 2-(4-n-Pentylphenyl)-6-n-hexyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-n-Pentylphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-
quinazoline,
5 2-(4-n-Pentylphenyl)-6-n-octyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-n-Pentylphenyl)-6-n-nonyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-n-Pentylphenyl)-6-n-decyl-5,6,7,8-tetrahydro-
10 quinazoline,
2-(4-n-Pentylphenyl)-6-(2-methylbutyl)-5,6,7,8-tetra-
hydroquinazoline,
2-(4-n-Pentylphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetra-
hydroquinazoline,
15 2-(4-n-Hexylphenyl)-6-methyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-n-Hexylphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-n-Hexylphenyl)-6-n-propyl-5,6,7,8-tetrahydroquina-
20 zoline,
2-(4-n-Hexylphenyl)-6-n-butyl-5,6,7,8-tetrahydroquina-
zoline,
2-(4-n-Hexylphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquina-
zoline,
25 2-(4-n-Hexylphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquina-
zoline,
2-(4-n-Hexylphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquina-
zoline,

- 2-(4-n-Hexylphenyl)-6-n-octyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Hexylphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazo-
line,
- 5 2-(4-n-Hexylphenyl)-6-n-decyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Hexylphenyl)-6-(2-methylbutyl)-5,6,7,8-tetra-
hydroquinazoline,
- 2-(4-n-Hexylphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetra-
10 hydroquinazoline,
- 2-(4-n-Heptylphenyl)-6-methyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Heptylphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazo-
line,
- 15 2-(4-n-Heptylphenyl)-6-n-propyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Heptylphenyl)-6-n-butyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Heptylphenyl)-6-n-pentyl-5,6,7,8-tetrahydro-
20 quinazoline,
- 2-(4-n-Heptylphenyl)-6-n-hexyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Heptylphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-
quinazoline,
- 25 2-(4-n-Heptylphenyl)-6-n-octyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Heptylphenyl)-6-n-nonyl-5,6,7,8-tetrahydro-
quinazoline,

- 2-(4-n-Heptylphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Heptylphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
- 5 2-(4-n-Octylphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octylphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octylphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
10 2-(4-n-Octylphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octylphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
15 2-(4-n-Octylphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octylphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octylphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
20 2-(4-n-Octylphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octylphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
- 25 2-[4-(2-Methylbutyl)-phenyl]-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-[4-(2-Methylbutyl)-phenyl]-6-ethyl-5,6,7,8-tetra-

- hydroquinazoline,
2-[4-(2-Methylbutyl)-phenyl]-6-n-propyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(2-Methylbutyl)-phenyl]-6-n-butyl-5,6,7,8-tetra-
5 hydroquinazoline,
2-[4-(2-Methylbutyl)-phenyl]-6-n-pentyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(2-Methylbutyl)-phenyl]-6-n-hexyl-5,6,7,8-tetra-
hydroquinazoline,
10 2-[4-(2-Methylbutyl)-phenyl]-6-n-heptyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(2-Methylbutyl)-phenyl]-6-n-octyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(2-Methylbutyl)-phenyl]-6-n-nonyl-5,6,7,8-tetra-
15 hydroquinazoline,
2-[4-(2-Methylbutyl)-phenyl]-6-n-decyl-5,6,7,8-tetra-
hydroquinazoline,

2-[4-(1-Methylheptyl)-phenyl]-6-methyl-5,6,7,8-tetra-
hydroquinazoline,
20 2-[4-(1-Methylheptyl)-phenyl]-6-ethyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(1-Methylheptyl)-phenyl]-6-n-propyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(1-Methylheptyl)-phenyl]-6-n-butyl-5,6,7,8-tetra-
25 hydroquinazoline,
2-[4-(1-Methylheptyl)-phenyl]-6-n-pentyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(1-Methylheptyl)-phenyl]-6-n-hexyl-5,6,7,8-tetra-

- hydroquinazoline,
2-[4-(1-Methylheptyl)-phenyl]-6-n-heptyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(1-Methylheptyl)-phenyl]-6-n-octyl-5,6,7,8-tetra-
5 hydroquinazoline,
2-[4-(1-Methylheptyl)-phenyl]-6-n-nonyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(1-Methylheptyl)-phenyl]-6-n-decyl-5,6,7,8-tetra-
hydroquinazoline,
- 10 2-(4-Methoxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Methoxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Methoxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazo-
line,
15 2-(4-Methoxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Methoxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquina-
zoline,
2-(4-Methoxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquina-
20 zoline,
2-(4-Methoxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquina-
zoline,
2-(4-Methoxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquina-
zoline,
25 2-(4-Methoxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquina-
zoline,
2-(4-Methoxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquina-
zoline,

- 2-(4-Methoxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,
2-(4-Methoxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
- 5 2-(4-Ethoxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Ethoxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Ethoxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
10 2-(4-Ethoxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Ethoxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
15 2-(4-Ethoxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Ethoxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Ethoxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
20 2-(4-Ethoxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Ethoxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,
25 2-(4-Ethoxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,

- 2-(4-n-Propoxyphenyl)-6-methyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Propoxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquina-
zoline,
- 5 2-(4-n-Propoxyphenyl)-6-n-propyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Propoxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Propoxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydro-
10 quinazoline,
- 2-(4-n-Propoxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Propoxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-
quinazoline,
- 15 2-(4-n-Propoxyphenyl)-6-n-octyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Propoxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Propoxyphenyl)-6-n-decyl-5,6,7,8-tetrahydro-
20 quinazoline,
- 2-(4-n-Propoxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetra-
hydroquinazoline,
- 2-(4-n-Propoxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetra-
hydroquinazoline,
- 25 2-(4-n-Butoxyphenyl)-6-methyl-5,6,7,8-tetrahydroquina-
zoline,
- 2-(4-n-Butoxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquina-
zoline,

- 2-(4-n-Butoxyphenyl)-6-n-propyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Butoxyphenyl)-6-n-butyl-5,6,7,8-tetrahydro-
quinazoline,
- 5 2-(4-n-Butoxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Butoxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Butoxyphenyl)-6-n-octyl-5,6,7,8-tetrahydro-
10 quinazoline,
- 2-(4-n-Butoxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Butoxyphenyl)-6-n-decyl-5,6,7,8-tetrahydro-
quinazoline,
- 15 2-(4-n-Butoxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetra-
hydroquinazoline,
- 2-(4-n-Butoxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetra-
hydroquinazoline,
- 2-(4-n-Pentyloxyphenyl)-6-methyl-5,6,7,8-tetrahydro-
20 quinazoline,
- 2-(4-n-Pentyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Pentyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydro-
quinazoline,
- 25 2-(4-n-Pentyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydro-
quinazoline,
- 2-(4-n-Pentyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydro-
quinazoline,

- 2-(4-n-Pentyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Pentyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-quinazoline,
- 5 2-(4-n-Pentyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Pentyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Pentyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydro-
- 10 quinazoline,
- 2-(4-n-Pentyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Pentyloxyphenyl)-6-(2-ethoxyphenyl)-5,6,7,8-tetrahydroquinazoline,
- 15 2-(4-n-Hexyloxyphenyl)-6-methyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Hexyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Hexyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydro-
- 20 quinazoline,
- 2-(4-n-Hexyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Hexyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydro-quinazoline,
- 25 2-(4-n-Hexyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Hexyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-quinazoline,

- 2-(4-n-Hexyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Hexyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydro-quinazoline,
- 5 2-(4-n-Hexyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Hexyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Hexyloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetra-
- 10 hydroquinazoline,
- 2-(4-n-Heptyloxyphenyl)-6-methyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Heptyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydro-quinazoline,
- 15 2-(4-n-Heptyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Heptyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Heptyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydro-
- 20 quinazoline,
- 2-(4-n-Heptyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Heptyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-quinazoline,
- 25 2-(4-n-Heptyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydro-quinazoline,
- 2-(4-n-Heptyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydro-quinazoline,

- 2-(4-n-Heptyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Heptyloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
- 5 2-(4-n-Octyloxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline, .
- 10 2-(4-n-Octyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
- 15 2-(4-n-Octyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
- 20 2-(4-n-Octyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Octyloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
- 25 2-[4-(2-Ethylhexyloxy)-phenyl]-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-[4-(2-Ethylhexyloxy)-phenyl]-6-ethyl-5,6,7,8-tetra-

- hydroquinazoline,
2-[4-(2-Ethylhexyloxy)-phenyl]-6-n-propyl-5,6,7,8-
tetrahydroquinazoline,
2-[4-(2-Ethylhexyloxy)-phenyl]-6-n-butyl-5,6,7,8-tetra-
5 hydroquinazoline,
2-[4-(2-Ethylhexyloxy)-phenyl]-6-n-pentyl-5,6,7,8-
tetrahydroquinazoline,
2-[4-(2-Ethylhexyloxy)-phenyl]-6-n-hexyl-5,6,7,8-tetra-
hydroquinazoline,
10 2-[4-(2-Ethylhexyloxy)-phenyl]-6-n-heptyl-5,6,7,8-
tetrahydroquinazoline,
2-[4-(2-Ethylhexyloxy)-phenyl]-6-n-octyl-5,6,7,8-tetra-
hydroquinazoline,
2-[4-(2-Ethylhexyloxy)-phenyl]-6-n-nonyl-5,6,7,8-tetra-
15 hydroquinazoline,

2-(4-Chlorophenyl)-6-methyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Chlorophenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Chlorophenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazo-
20 line,
2-(4-Chlorophenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Chlorophenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazo-
line,
25 2-(4-Chlorophenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Chlorophenyl)-6-n-heptyl-5,6,7,8-tetrahydroquina-
zoline,

- 2-(4-Chlorophenyl)-6-n-octyl-5,6,7,8-tetrahydroquina-
zoline,
2-(4-Chlorophenyl)-6-n-nonyl-5,6,7,8-tetrahydroquina-
zoline,
5 2-(4-Chlorophenyl)-6-n-decyl-5,6,7,8-tetrahydroquina-
zoline,
2-(4-Chlorophenyl)-6-(2-methylbutyl)-5,6,7,8-tetra-
hydroquinazoline,
2-(4-Chlorophenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydro-
10 quinazoline,

2-(4-Bromophenyl)-6-methyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Bromophenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Bromophenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazo-
15 line,
2-(4-Bromophenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Bromophenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazo-
line,
20 2-(4-Bromophenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazo-
line, m.p. 167°;
2-(4-Bromophenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Bromophenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazo-
25 line,
2-(4-Bromophenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Bromophenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazo-

line,

2-(4-Bromophenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,

2-(4-Fluorophenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
5 line,

2-(4-Fluorophenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,

2-(4-Fluorophenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
line,

2-(4-Fluorophenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
10 line,

2-(4-Fluorophenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
line,

2-(4-Fluorophenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
line,

15 2-(4-Fluorophenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
line,

2-(4-Fluorophenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
line,

2-(4-Fluorophenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
20 line,

2-(4-Fluorophenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
line,

2-(4-Fluorophenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline,

25 2-(4-Fluorophenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,

2-(4-Nitrophenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,

- 2-(4-Nitrophenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Nitrophenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Nitrophenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazo-
5 line,
2-(4-Nitrophenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Nitrophenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazo-
line,
10 2-(4-Nitrophenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Nitrophenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Nitrophenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazo-
15 line,
2-(4-Nitrophenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazo-
line,
2-(4-Nitrophenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydro-
quinazoline and
20 2-(4-Nitrophenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydro-
quinazoline.

Example 2

26.5 g of 2-(4-bromophenyl)-6-n-hexyl-5,6,7,8-
tetrahydroquinazoline and 7.6 g of copper-(I) cyanide
25 in 70 ml of N-methylpyrrolid-2-one are heated to 200°
for 2.5 hours, with stirring. After cooling, the
reaction mixture is poured into 300 ml of ice-water and
the precipitate thus forming is filtered off and washed
with water. After drying, the black-grey precipitate

is digested with five times 50 ml of diethyl ether and the ether filtrates are dried over sodium sulfate and evaporated. The remaining 2-(4-cyanophenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline is recrystallised
5 from ethanol with the addition of active charcoal; yield 17.3 g of colourless crystals, m.p. 90° , c.p. 108° .

The following are prepared analogously:

- 2-(4-Cyanophenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
10 2-(4-Cyanophenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Cyanophenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Cyanophenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
15 2-(4-Cyanophenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline, m.p. 98° , c.p. 114° ,
2-(4-Cyanophenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Cyanophenyl)-6-n-octyl-5,6,7,8-tetrahydroquin-
20 azoline,
2-(4-Cyanophenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Cyanophenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
25 2-(4-Cyanophenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and
2-(4-Cyanophenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline.

Example 3

(a) 37.3 g of 2-(4-benzyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline are hydrogenated in 300 ml of methanol at 60° under normal pressure in the presence of 10 g of palladium-on-active charcoal (5% of Pd), until the absorption of hydrogen ceases. The catalyst is then filtered off, the filtrate is evaporated and the remaining 2-(4-hydroxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline is recrystallised from ethanol; yield 21.6 g.

The following are prepared analogously:

- 2-(4-Hydroxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Hydroxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Hydroxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Hydroxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Hydroxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Hydroxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline, 2-(
2-(4-Hydroxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Hydroxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Hydroxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,

2-(4-Hydroxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and

2-(4-Hydroxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline.

- 5 (b) 6.7 g of n-hexanoyl chloride are added dropwise, at 100° and with stirring, to a solution of 11.3 g of 2-(4-hydroxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline and 4 g of pyridine in 100 ml of toluene. After further stirring for two hours, the reaction mixture is
10 filtered while still hot, the pyridine hydrochloride which has been filtered off is rinsed with 50 ml of toluene and the combined filtrates are evaporated. The remaining 2-(4-n-hexanoyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline is recrystallised from ethyl
15 acetate; yield 15.3 g of colourless crystals.

The following are prepared analogously:

- 2-(4-Acetoxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Acetoxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
20 2-(4-Acetoxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Acetoxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
25 2-(4-Acetoxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Acetoxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Acetoxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquin-

- azoline,
2-(4-Acetoxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquin-
azoline,
2-(4-Acetoxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquin-
5 azoline,
2-(4-Acetoxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquin-
azoline,
2-(4-Acetoxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetra-
hydroquinazoline and
10 2-(4-Acetoxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetra-
hydroquinazoline.
- 2-(4-Propionyloxyphenyl)-6-methyl-5,6,7,8-tetrahydro-
quinazoline,
15 2-(4-Propionyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-Propionyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-Propionyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydro-
20 quinazoline,
2-(4-Propionyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-Propionyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydro-
quinazoline,
25 2-(4-Propionyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-Propionyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-Propionyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydro-

- quinazoline,
2-(4-Propionyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-Propionyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-
5 tetrahydroquinazoline and
2-(4-Propionyloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-
tetrahydroquinazoline.
- 2-(4-n-Butyryloxyphenyl)-6-methyl-5,6,7,8-tetrahydro-
quinazoline,
10 2-(4-n-Butyryloxyphenyl)-6-ethyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-n-Butyryloxyphenyl)-6-n-propyl-5,6,7,8-tetra-
hydroquinazoline,
2-(4-n-Butyryloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydro-
15 quinazoline,
2-(4-n-Butyryloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-n-Butyryloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydro-
quinazoline,
20 2-(4-n-Butyryloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-n-Butyryloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-n-Butyryloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydro-
25 quinazoline,
2-(4-n-Butyryloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydro-
quinazoline,
2-(4-n-Butyryloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetra-

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hydroquinazoline and

2-(4-n-Butyryloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,

5 2-(4-n-Pentanoyloxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,

2-(4-n-Pentanoyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,

2-(4-n-Pentanoyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,

10 2-(4-n-Pentanoyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,

2-(4-n-Pentanoyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,

15 2-(4-n-Pentanoyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,

2-(4-n-Pentanoyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,

2-(4-n-Pentanoyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,

20 2-(4-n-Pentanoyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,

2-(4-n-Pentanoyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,

25 2-(4-n-Pentanoyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and

2-(4-n-Pentanoyloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,

- 2-(4-n-Hexanoyloxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Hexanoyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
- 5 2-(4-n-Hexanoyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Hexanoyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Hexanoyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
- 10 2-(4-n-Hexanoyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Hexanoyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
- 15 2-(4-n-Hexanoyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Hexanoyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Hexanoyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and
- 20 2-(4-n-Hexanoyloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Heptanoyloxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
- 25 2-(4-n-Heptanoyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Heptanoyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,

- 2-(4-n-Heptanoyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Heptanoyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
- 5 2-(4-n-Heptanoyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Heptanoyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Heptanoyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydro-
- 10 quinazoline,
- 2-(4-n-Heptanoyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Heptanoyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
- 15 2-(4-n-Heptanoyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and
- 2-(4-n-Heptanoyloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Octanoyloxyphenyl)-6-methyl-5,6,7,8-tetrahydro-
- 20 quinazoline,
- 2-(4-n-Octanoyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Octanoyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
- 25 2-(4-n-Octanoyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Octanoyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,

- 2-(4-n-Octanoyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Octanoyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
- 5 2-(4-n-Octanoyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Octanoyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Octanoyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
- 10 2-(4-n-Octanoyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and
- 2-(4-n-Octanoyloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
- 15 2-(4-Ethoxycarbonyloxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-Ethoxycarbonyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-Ethoxycarbonyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
- 20 2-(4-Ethoxycarbonyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-Ethoxycarbonyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
- 25 2-(4-Ethoxycarbonyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-Ethoxycarbonyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,

- 2-(4-Ethoxycarbonyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Ethoxycarbonyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
5 2-(4-Ethoxycarbonyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Ethoxycarbonyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and
2-(4-Ethoxycarbonyloxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-
10 tetrahydroquinazoline,
- 2-(4-n-Propoxycarbonyloxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Propoxycarbonyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
15 2-(4-n-Propoxycarbonyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Propoxycarbonyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Propoxycarbonyloxyphenyl)-6-n-pentyl-5,6,7,8-
20 tetrahydroquinazoline,
2-(4-n-Propoxycarbonyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
2-(4-n-Propoxycarbonyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
25 2-(4-n-Propoxycarbonyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,

- 2-(4-n-Propoxycarbonyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Propoxycarbonyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and
- 5 2-(4-n-Propoxycarbonyloxyphenyl)-6-(ethylhexyl)-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Butoxycarbonyloxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Butoxycarbonyloxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
- 10 2-(4-n-Butoxycarbonyloxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Butoxycarbonyloxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
- 15 2-(4-n-Butoxycarbonyloxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Butoxycarbonyloxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Butoxycarbonyloxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline,
- 20 2-(4-n-Butoxycarbonyloxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Butoxycarbonyloxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
- 25 2-(4-n-Butoxycarbonyloxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Butoxycarbonyloxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and

- 2-(4-n-Butoxycarbonyloxyphenyl)-6-(2-ethylhexyl)-
5,6,7,8-tetrahydroquinazoline,
- 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-methyl-5,6,7,8-
tetrahydroquinazoline,
- 5 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-ethyl-5,6,7,8-
tetrahydroquinazoline,
- 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-n-propyl-5,6,7,8-
tetrahydroquinazoline,
- 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-n-butyl-5,6,7,8-
10 tetrahydroquinazoline,
- 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-n-pentyl-5,6,7,8-
tetrahydroquinazoline,
- 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-n-hexyl-5,6,7,8-
tetrahydroquinazoline,
- 15 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-n-heptyl-5,6,7,8-
tetrahydroquinazoline,
- 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-n-octyl-5,6,7,8-
tetrahydroquinazoline,
- 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-n-nonyl-5,6,7,8-
20 tetrahydroquinazoline,
- 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-n-decyl-5,6,7,8-
tetrahydroquinazoline,
- 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-(2-methylbutyl)-
5,6,7,8-tetrahydroquinazoline and
- 25 2-(4-n-Pentyloxycarbonyloxyphenyl)-6-(2-ethylhexyl)-
5,6,7,8-tetrahydroquinazoline.
- 2-(4-n-Hexyloxycarbonyloxyphenyl)-6-methyl-5,6,7,8-

- tetrahydroquinazoline,
2-(4-n-Hexyloxycarbonyloxyphenyl)-6-ethyl-5,6,7,8-
tetrahydroquinazoline,
2-(4-n-Hexyloxycarbonyloxyphenyl)-6-n-propyl-5,6,7,8-
5 tetrahydroquinazoline,
2-(4-n-Hexyloxycarbonyloxyphenyl)-6-n-butyl-5,6,7,8-
tetrahydroquinazoline,
2-(4-n-Hexyloxycarbonyloxyphenyl)-6-n-pentyl-5,6,7,8-
tetrahydroquinazoline,
10 2-(4-n-Hexyloxycarbonyloxyphenyl)-6-n-hexyl-5,6,7,8-
tetrahydroquinazoline,
2-(4-n-Hexyloxycarbonyloxyphenyl)-6-n-heptyl-5,6,7,8-
tetrahydroquinazoline,
2-(4-n-Hexyloxycarbonyloxyphenyl)-6-n-octyl-5,6,7,8-
15 tetrahydroquinazoline,
2-(4-n-Hexyloxycarbonyloxyphenyl)-6-n-nonyl-5,6,7,8-
tetrahydroquinazoline,
2-(4-n-Hexyloxycarbonyloxyphenyl)-6-n-decyl-5,6,7,8-
tetrahydroquinazoline,
20 2-(4-n-Hexyloxycarbonyloxyphenyl)-6-(2-methylbutyl)-
5,6,7,8-tetrahydroquinazoline and
2-(4-n-Hexyloxycarbonyloxyphenyl)-6-(2-ethylhexyl)-
5,6,7,8-tetrahydroquinazoline.

Example 4

- 25 (a) 16.7 g of 2-(4-cyanophenyl)-6-n-heptyl-5,6,7,8-
tetrahydroquinazoline and a solution of 6 g of potassium
hydroxide in 50 ml of ethanol are heated to the boil for
4 hours. The reaction mixture is then poured into
200 ml of water, the aqueous solution is acidified with

10 % strength aqueous hydrochloric acid (pH 2 - 3) and the acid solution is extracted by shaking with three times 100 ml of diethyl ether. The organic phases are dried over calcium chloride and evaporated. 14 g of
5 2-(4-carboxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline remain as a grey-white, crystalline mass.

The following are prepared analogously:

- 2-(4-Carboxyphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
10 2-(4-Carboxyphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Carboxyphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Carboxyphenyl)-6-n-butyl-5,6,7,8-tetrahydroquin-
15 azoline,
2-(4-Carboxyphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Carboxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
20 2-(4-Carboxyphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Carboxyphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Carboxyphenyl)-6-n-decyl-5,6,7,8-tetrahydroquin-
25 azoline,
2-(4-Carboxyphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and
2-(4-Carboxyphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline.

(b) 7 g of 2-(4-carboxyphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline together with 15 g of sulfur tetrafluoride are heated in a sealed tube to 100° for 8 hours. After cooling, excess sulfur tetrafluoride is removed by blowing in nitrogen and the remaining 2-(4-trifluoromethylphenyl)-6-n-heptyl-5,6,7,8-tetrahydroquinazoline is recrystallised from ethanol; yield 4.8 g of colourless crystals.

The following are prepared analogously:

- 10 2-(4-Trifluoromethylphenyl)-6-methyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Trifluoromethylphenyl)-6-ethyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Trifluoromethylphenyl)-6-n-propyl-5,6,7,8-tetrahydroquinazoline,
15 2-(4-Trifluoromethylphenyl)-6-n-butyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Trifluoromethylphenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline,
20 2-(4-Trifluoromethylphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Trifluoromethylphenyl)-6-n-octyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Trifluoromethylphenyl)-6-n-nonyl-5,6,7,8-tetrahydroquinazoline,
25 2-(4-Trifluoromethylphenyl)-6-n-decyl-5,6,7,8-tetrahydroquinazoline,
2-(4-Trifluoromethylphenyl)-6-(2-methylbutyl)-5,6,7,8-tetrahydroquinazoline and

(93)

2-(4-Trifluoromethylphenyl)-6-(2-ethylhexyl)-5,6,7,8-tetrahydroquinazoline.

The following examples relate to liquid-crystalline dielectrics according to the invention:

5 Example 5

A mixture of 40 parts by weight of 4-(trans-4-n-propylcyclohexyl)-benzonitrile and 60 parts by weight of 4-(trans-4-n-pentylcyclohexyl)-benzonitrile has a nematic phase in the temperature range from $+8^{\circ}$ to $+51^{\circ}$.

- 10 A ternary liquid-crystalline dielectric having a nematic phase in the temperature range from $+2^{\circ}$ to $+60^{\circ}$ is obtained by adding 22 parts by weight of 2-(4-n-butoxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline.

Example 6

- 15 A mixture of 35 parts by weight of 4-(trans-4-n-propylcyclohexyl)-benzonitrile and 65 parts by weight of 4-n-pentyl-4'-cyanobiphenyl has a nematic phase in the temperature range from $+3^{\circ}$ to $+39^{\circ}$. A liquid-crystalline dielectric which represents a ternary
- 20 eutectic having a nematic phase in the temperature range from -3° to $+48^{\circ}$ is obtained by adding 19 parts by weight of 2-(4-n-butoxyphenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline.

Example 7

- 25 A mixture of 30 parts by weight of 4-(trans-4-n-butylcyclohexyl)-benzonitrile, 55 parts by weight of 4-n-pentylphenyl anisate and 15 parts by weight of 4-(trans-4-n-pentylcyclohexyl)-4'-cyanobiphenyl has a nematic phase in the temperature range from $+6^{\circ}$ to $+64^{\circ}$

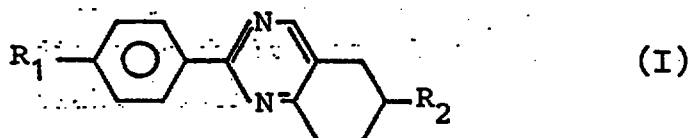
and a DCA of +8.1. A liquid-crystalline dielectric which is a quaternary eutectic with a nematic phase in the temperature range from +2° to +67° and a DCA of +9.3 is obtained by adding 12 parts by weight of 2-(4-cyanophenyl)-6-n-hexyl-5,6,7,8-tetrahydroquinazoline.

Example 8

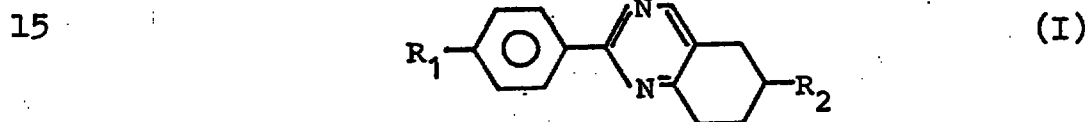
A mixture of 31 parts by weight of 4-(trans-4-n-propylcyclohexyl)-1-n-butoxybenzene, 33 parts by weight of 4'-n-pentylphenyl 4-n-hexyloxybenzoate and 36 parts by weight of 4'-n-heptylphenyl 4-n-hexanoyloxybenzoate has a nematic phase in the temperature range from +6° to +48°, a DCA of -0.2 and an optical anisotropy of +0.12. A liquid-crystalline dielectric with a nematic phase in the temperature range from +3° to +51°, a DCA of +2.5 and an optical anisotropy of +0.13 is obtained by adding 10 parts by weight of 2-(4-cyanophenyl)-6-n-pentyl-5,6,7,8-tetrahydroquinazoline.

Patent Claims

1. Tetrahydroquinazolines of the formula (I)

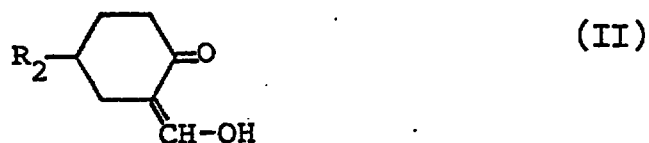


- wherein R_1 denotes alkyl, alkoxy, alkanoyloxy or alkoxy-
5 carbonyloxy with up to 8 carbon atoms in each case, CN, CF_3 , halogen or NO_2 and R_2 denotes alkyl with up to 10 carbon atoms.
2. Tetrahydroquinazolines according to Claim 1 of the formula (I), wherein R_1 is CN.
- 10 3. Tetrahydroquinazolines according to Claim 1 of the formula (I), wherein R_1 is alkyl, alkoxy or alkanoyloxy having up to 6 carbon atoms.
4. Process for the manufacture of tetrahydroquinazolines of the formula (I)

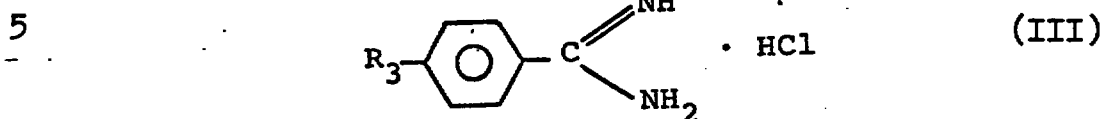


- wherein R_1 denotes alkyl, alkoxy, alkanoyloxy or alkoxy-
carbonyloxy with up to 8 carbon atoms in each case, CN, CF_3 , halogen or NO_2 and R_2 denotes alkyl with up to 10 carbon atoms, characterised in that a compound of the
20 formula (II)

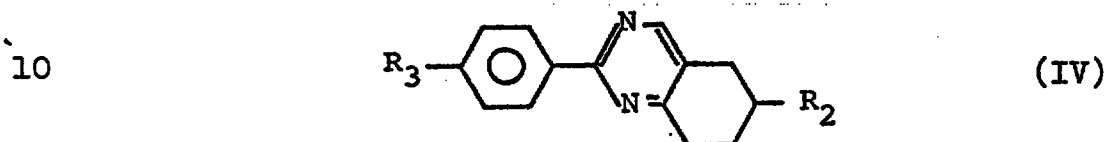




wherein R_2 has the meaning indicated above, is reacted, in the presence of a basic condensation agent, with a compound of the formula (III)

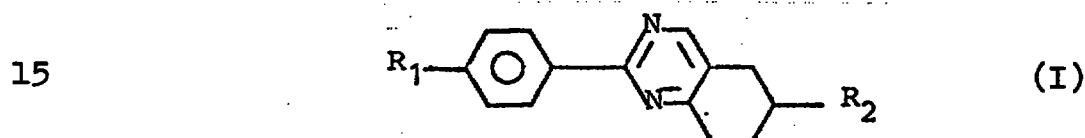


wherein R_3 denotes alkyl or alkoxy having up to 8 C atoms, benzyloxy, halogen or NO_2 , and, if desired, the radical R_3 in the compound, thus obtained, of the formula (IV)



is converted in a manner known per se to a radical R_1 which differs from R_3 .

5. Use of a tetrahydroquinazoline of the formula (I)

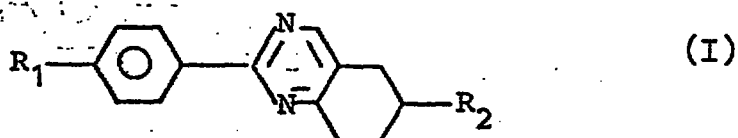


wherein R_1 denotes alkyl, alkoxy, alkanoyloxy or alkoxy-carbonyloxy with up to 8 carbon atoms in each case, CN,



CF₃, halogen or NO₂ and R₂ denotes alkyl with up to 10 carbon atoms, as a component of a liquid-crystalline dielectric.

6. Liquid-crystalline dielectric, characterised in
5 that it contains 1 to 50 per cent by weight of a tetrahydroquinazoline of the formula (I)



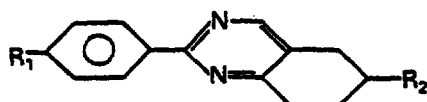
wherein R₁ denotes alkyl, alkoxy, alkanoyloxy or alkoxy-carbonyloxy with up to 8 carbon atoms in each case, CN,
10 CF₃, halogen or NO₂ and R₂ denotes alkyl with up to 10 carbon atoms.

7. Electro-optical display element based on a liquid crystal cell, characterised in that it contains a liquid-crystalline dielectric according to Claim 6.



Patentansprüche

1. Tetrahydrochinazoline der Formel (I)



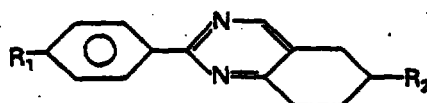
(I)

worin R₁ Alkyl, Alkoxy, Alkanoyloxy oder Alkoxy-carbonyloxy mit jeweils bis zu 8 Kohlenstoffatomen, CN, CF₃, Halogen oder NO₂ und R₂ Alkyl mit bis zu 10 Kohlenstoffatomen bedeutet.

2. Tetrahydrochinazoline nach Anspruch 1 der Formel (I), worin R₁ CN ist.

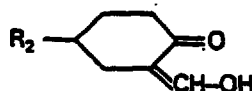
3. Tetrahydrochinazoline nach Anspruch 1 der Formel (I), worin R₁ Alkyl, Alkoxy oder Alkanoyloxy mit bis zu 6 Kohlenstoffatomen ist.

4. Verfahren zur Herstellung von Tetrahydrochinazolinen der Formel (I)



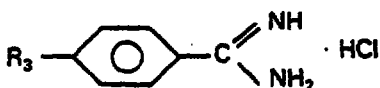
(II)

worin R₁ Alkyl, Alkoxy, Alkanoyloxy oder Alkoxy-carbonyloxy mit jeweils bis zu 8 Kohlenstoffatomen, CN, CF₃, Halogen oder NO₂ und R₂ Alkyl mit bis zu 10 Kohlenstoffatomen bedeutet, dadurch gekennzeichnet, dass man eine Verbindung der Formel (II)



(III)

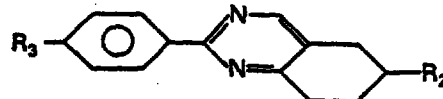
worin R₂ die vorstehend angegebene Bedeutung besitzt, in Gegenwart eines basischen Kondensationsmittels mit einer Verbindung der Formel (III) umgesetzt



(IV)

worin R₃ Alkyl oder Alkoxy mit bis zu 8 C-Atomen, Benzyloxy, Halogen oder NO₂ bedeutet, und ge-

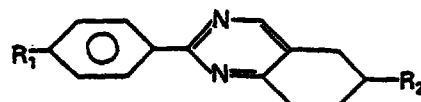
wünschtensfalls in der dabei erhaltenen Verbindung der Formel (IV)



(IV)

den Rest R₃ in an sich bekannter Weise in einen davon verschiedenen Rest R₁ umwandelt.

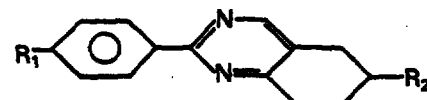
5. Verwendung eines Tetrahydrochinazolins der Formel (I)



(I)

worin R₁ Alkyl, Alkoxy, Alkanoyloxy oder Alkoxy-carbonyloxy mit jeweils bis zu 8 Kohlenstoffatomen, CN, CF₃, Halogen oder NO₂ und R₂ Alkyl mit bis zu 10 Kohlenstoffatomen bedeutet, als Komponente eines flüssigkristallinen Dielektrikums.

6. Flüssigkristallines Dielektrikum, dadurch gekennzeichnet, dass es 1 bis 50 Gewichtsprozent eines Tetrahydrochinazolins der Formel (I) enthält,



(I)

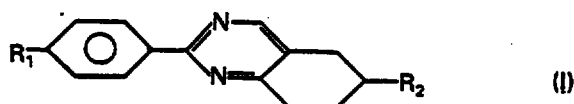
worin R₁ Alkyl, Alkoxy, Alkanoyloxy oder Alkoxy-carbonyloxy mit jeweils bis zu 8 Kohlenstoffatomen, CN, CF₃, Halogen oder NO₂ und R₂ Alkyl mit bis zu 10 Kohlenstoffatomen bedeutet.

7. Elektrooptisches Anzeigeelement auf der Basis einer Flüssigkristallzelle, dadurch gekennzeichnet, dass es ein flüssigkristallines Dielektrikum nach Anspruch 6 enthält.



Revendications

1. Tétrahydroquinazolines de formule (I)

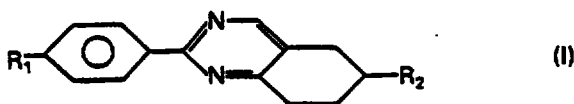


dans laquelle R₁ représente un radical alkyle, alcoxy, alcanoyloxy ou alcoxycarbonyloxy avec jusqu'à 8 atomes de carbone, CN, CF₃, halogène ou NO₂ et R₂ est un radical alkyle avec jusqu'à 10 atomes de carbone.

2. Tétrahydroquinazolines selon la revendication 1 de formule (I), où R₁ est CN.

3. Tétrahydroquinazolines selon la revendication 1 de formule (I), dans laquelle R₁ est un radical alkyle, alcoxy ou alcanoyloxy avec jusqu'à 6 atomes de carbone.

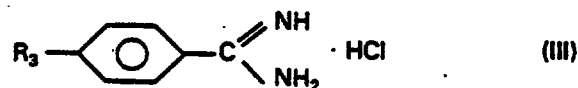
4. Procédé pour la fabrication des tétrahydroquinazolines de formule (I)



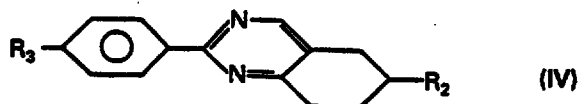
dans laquelle R₁ représente un radical alkyle, alcoxy, alcanoyloxy ou alcoxycarbonyloxy avec respectivement jusqu'à 8 atomes de carbone, CN, CF₃, halogène ou NO₂ et R₂ est un radical alkyle avec jusqu'à 10 atomes de carbone, caractérisé par le fait qu'on fait réagir une combinaison de formule (II)



dans laquelle R₂ a la signification indiquée ci-dessus, en présence d'un agent de condensation basique, avec une combinaison de la formule (III)

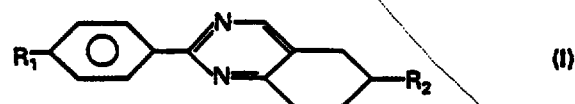


dans laquelle R₃ représente un radical alkyle ou alcoxy avec jusqu'à 8 atomes de carbone, benzoyloxy, halogène ou NO₂ et, le cas échéant, on transforme, dans la combinaison obtenue alors de formule (IV)



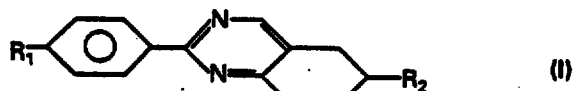
le radical R₃ d'une manière connue en un radical R₁ différent de celui-ci.

5. Utilisation d'une tétrahydroquinazoline de formule (I)



dans laquelle R₁ représente un radical alkyle, alcoxy, alcanoyloxy ou alcoxycarbonyloxy avec respectivement jusqu'à 8 atomes de carbone, CN, CF₃, halogène ou NO₂ et R₂ est un radical alkyle avec jusqu'à 10 atomes de carbone, comme composant d'un diélectrique à cristaux liquides.

6. Diélectrique à cristaux liquides caractérisé par le fait qu'il contient jusqu'à 1 à 50% en poids d'une tétrahydroquinazoline de formule (I),



dans laquelle R₁ représente un radical alkyle, alcoxy, alcanoyloxy ou alcoxycarbonyloxy avec respectivement jusqu'à 8 atomes de carbone, CN, CF₃, halogène ou NO₂ et R₂ est un radical alkyle avec jusqu'à 10 atomes de carbone.

7. Élément d'affichage électro-optique à base d'une cellule de cristaux liquides, caractérisé par le fait qu'il renferme un diélectrique à cristaux liquides selon la revendication 6.

