

the diisocyanate groups are bonded to aliphatic hydrocarbon radicals having 2 to 12 carbon atoms or cycloaliphatic or mixed aliphatic-cycloaliphatic hydrocarbon radicals having 4 to 15 carbon atoms.

Typical examples of suitable diisocyanates are ethylene diisocyanate, tetramethylene diisocyanate, hexamethylene diisocyanate, dodecamethylene diisocyanate, cyclobutane 1,3-diisocyanate, cyclohexane 1,3- and 1,4-diisocyanate or 1-isocyanate-3,3,5-trimethyl-5-isocyanatomethylcyclohexane or isophorone diisocyanate. Mixtures of the abovementioned diisocyanates can also be employed. Isophorone diisocyanate is particularly preferred.

Polyether-diols which can be employed in the context of the invention can be obtained, in particular, by random polymerization or block polymerization of epoxides, such as ethylene oxide, propylene oxide, butylene oxide, tetrahydrofuran or epichlorohydrin, or else by addition of these epoxides, optionally as a mixture or in succession, onto starting components with reactive hydrogen atoms, such as alcohols or amines, or water, ethylglycol or 1,2-propylene glycol. Those polyethers in which the free OH groups are chiefly primary OH groups are preferably employed.

Diamines which are suitable in the context of the invention are, for example, aliphatic, cycloaliphatic or mixed aliphatic-cycloaliphatic diamines which contain primary amino groups and have a number-average molecular weight in the range from 60 to 300. Typical examples are ethylenediamine, tetramethylenediamine, hexamethylenediamine, 4,4'-diaminodicyclohexylmethane, 1,4-diaminocyclohexane, 1,4-diaminocyclohexane, 4,4'-diamino-3,3'-dimethyldicyclohexylmethane or 1-amino-3,3,5-trimethyl-5-aminomethylcyclohexane (isophoronediamine). 4,4'-Diaminodicyclohexylmethane and isophoronediamine are particularly preferred.

Typical examples of alkanediols are ethylene glycol, 1,2-propylene glycol, 1,4-butylene glycol, 2,3-butylene glycol, 1,6-hexanediol, 1,8-octanediol, neopentylglycol, cyclohexanedimethanol, 1,4-bis-hydroxymethylcyclohexane, 2-methyl-1,3-propanediol, 3-methylpentane-1,5-diol, diethylene glycol, triethylene glycol, tetraethylene glycol, polyethylene glycols, dipropylene glycol, tri- and tetrapropylene glycol, polypropylene glycol, dibutylene glycol and polybutylene glycol.

Suitable alkoxysilylanines for the introduction of alkoxysilyl groups of the general formula III into the plastics of the invention can be prepared, for example, by subjecting the alkoxysilane compounds known for example from DE-A 36 36 974, in particular the commercially obtainable gamma-aminopropyl-tri-C<sub>1</sub>-C<sub>4</sub>-alkoxysilanes or bis(3-C<sub>1</sub>-C<sub>4</sub>-alkoxysilylpropyl)amines, preferably gamma-aminopropyl-trimethoxy- or -triethoxysilane, to a transesterification with monohydroxy compounds of the general formula VI



with the above meanings for p, q, A and R<sup>4</sup>.

R<sup>4</sup> can furthermore contain polymerizable olefinic double bonds; plastics structured in this way then have polycondensation centres, in addition to polymerization centres, and can be cured in two stages. In the first case, high compatibility of the group VI emerging during the condensation with the "backbone" material is to be assumed. In the other case, during subsequent polymerization, for example photopolymerization, redox polymerization or hot polymerization, of the compound (VI) liberated, this is fixed into the "backbone" material. The favourable shrinkage properties of the plastics of the invention follow from this.

If the polyaddition products of the invention do not already contain polymerizable olefinic double bonds, but also if they do, the customary monomers which can be cured by free radicals can be added, in particular monofunctional or polyfunctional (meth)acrylates known per se, in particular methyl methacrylate, isobutyl methacrylate, cyclohexyl methacrylate, ethylene glycol dimethacrylate, diethylene glycol dimethacrylate, polyethylene glycol dimethacrylate, butanediol dimethacrylate, hexanediol dimethacrylate, decanediol dimethacrylate, dodecanediol dimethacrylate, bisphenol A dimethacrylate, trimethylolpropane trimethacrylate and furthermore bis-GMA, as well as reaction products of isocyanates, in particular di- and/or triisocyanates, and methacrylates containing OH groups. Typical examples of the compounds mentioned last are reaction products of 1 mol of hexamethylene diisocyanate with 2 mol of 2-hydroxyethyl methacrylate, of 1 mol of tris(6-isocyanatoethyl) isocyanurate with 3 mol of hydroxyethyl methacrylate, and of 1 mol of trimethylhexamethylene diisocyanate with 2 mol of hydroxyethyl methacrylate. The content of these compounds in the mixture with the silicopolyether or silicopolyethers can vary between 5 and 90% by weight. Dye-stuffs, optionally also those which result in a change in colour when complete curing has taken place, can furthermore also be added to the plastics of the invention, and, in addition, also emulsifiers for establishing the rheological properties, antibiotics, haemostatic agents and the like. The filler content in the plastic of the invention can in general be in the range from 40 to 80% by weight.

The invention is explained in more detail in the following with the aid of preferred embodiment examples and comparison examples.

#### Comparison Example 1

a) 912.5 g (0.5 mol of OH) of a linear polyether-diol (molecular weight 3,650, block copolymer prepared by polyaddition of 80 parts by weight of propylene oxide onto propylene glycol and subsequent polyaddition of 30 parts by weight of ethylene oxide) were dried at 100° C. under an oil pump vacuum (0.2 hPa) for 1 hour. After the mixture had cooled to room temperature, 111 g (0.5 mol) of isophorone diisocyanate and 1 drop of tin ethylhexanoate were added to the mixture. The mixture was heated to 100° C. under a gentle stream of nitrogen and left at this temperature for 60 minutes. After cooling to room temperature, the NCO index of the prepolymer was determined:

NCO found: 1.87%

NCO calculated: 2.05%

89.65 g (0.5 mol) of 3-aminopropyltrimethoxysilane were then added dropwise in the course of 2 hours, so that only moderate heating of the reaction mixture occurred. After the mixture had been stirred at room temperature for a further hour, an NCO band could no longer be detected in the IR spectrum.

The poly(ether-urethane-urea) formed is a clear, only slightly yellowish-coloured composition with good flow properties.

b) To crosslink the prepolymers prepared in the above Stage a), a hardener substance comprising 15% by weight of phosphoric acid, 35% by weight of water (doubly distilled) and 50% by weight of glycerol is stirred together.

20 g of prepolymer from Stage a) are stirred with 0.7 g of the abovementioned hardener liquid on a mixing block for 30 seconds.

The composition cures completely within a few minutes to give an elastic, non-tacky shaped article.