polyalkylene oxide used to increase the hydrophilicity are usually attained. In this context, incorporation rate is understood to mean the amount of polyalkylene oxide incorporated into the polyarylethersulfone-polyalkylene oxide block copolymer obtained, based on the amount of polyalkylene oxide originally used in the polycondensation reaction. Moreover, for the methods described in the prior art for preparing polyarylethersulfone-polyalkylene oxide block copolymers, very wide molecular weight distributions are usually obtained. A measure of the molecular weight distribution is the polydispersity (Q). The polydispersity (Q) is defined as the quotient of the weight average molecular weight (M_W) and the number average molecular weight (M_n). In the methods described in the prior art, polydispersities (Q) of significantly greater than 4 are usually obtained.

The object of the embodiments disclosed herein is therefore to provide a method for preparing polyarylethersulfone-polyalkylene oxide block copolymers (PPC), which does not have, or has only to a reduced degree, the disadvantages of the methods described in the prior art. The method should be simple to carry out, as far as possible not prone to error, and inexpensive. The method according to the disclosure should achieve good incorporation rates based on the polyalkylene oxide used. In addition, the method according to the disclosure should make available polyarylethersulfone-polyalkylene oxide block copolymers (PPC) having a narrow molecular weight distribution and therefore a low polydispersity (Q). The polyarylethersulfone-polyalkylene oxide block copolymers (PPC) should have, in addition, a high glass transition temperature and also a low fraction of impurities such as azeotroping agent.

The object is achieved according to the first aspect of the present disclousre by a method for preparing polyarylethersulfone-polyalkylene oxide block copolymers (PPC) comprising the polycondensation of a reaction mixture (R_G) comprising the components:

(A1) at least one aromatic dihalogen compound,

(B1) at least one aromatic dihydroxyl compound,

(B2) at least one polyalkylene oxide compound having at least one free hydroxyl group (–OH) and at least one capped hydroxyl group (-OR^A),

(C) at least one aprotic polar solvent and

(D) at least one metal carbonate,

where the reaction mixture (R_G) does not comprise any substance which forms an azeotrope with water.

It has been found that polyarylethersulfone-polyalkylene oxide block copolymers (PPC) having a lower polydispersity (Q) are obtainable by the method according to the

disclosure. This is surprising in that, in the methods described in the prior art, the use of an azeotroping agent is described as a mandatory requirement. In the method according to the disclosure, polyarylethersulfone-polyalkylene oxide block copolymers (PPC) are also accessible comprising 4,4'-dihydroxybiphenyl or 4,4'-dihydroxydiphenylsulfone as aromatic dihydroxy compound. In this manner it is possible to prepare polyarylethersulfone-polyalkylene oxide block copolymers (PPC) comprising less bisphenol A than the polymers described in the prior art. It is also possible to prepare polyarylethersulfone-polyalkylene oxide block copolymers (PPC) which are free of bisphenol A, i.e. the use of bisphenol A as monomer is dispensed with in the preparation thereof. This is advantageous since bisphenol A is toxicologically harmful.

In another aspect, there is provided a polyarylethersulfone-polyalkylene oxide block copolymer (PPC) obtainable as defined above.

Reaction mixture (R_G)

For the preparation of the polyarylethersulfone-polyalkylene oxide block copolymer (PPC) according to the invention, a reaction mixture (R_G) comprising the components (A1), (B1), (B2), (C) and (D) described above is reacted. The components (A1), (B1) and (B2) enter into a polycondensation reaction.

Component (C) acts as solvent. Component (D) acts as base to deprotonate the components (B1) and (B2) during the condensation reaction.

Reaction mixture (R_G) is understood to mean the mixture that is used in the method according to the invention for preparing the polyarylethersulfone-polyalkylene oxide block copolymers (PPC). In the present case, all details given with respect to the reaction mixture (R_G) thus relate to the mixture that is present prior to the polycondensation. The polycondensation takes place during the method according to the invention, in which the reaction mixture (R_G) reacts by polycondensation of components (A1), (B1) and (B2) to give the target product, the polyarylethersulfone-polyalkylene oxide block copolymer (PPC). The mixture obtained after the polycondensation, which comprises the polyarylethersulfone-polylalkylene oxide block polymer (PPC) target product, is also referred to as product mixture (P_G).

The components of the reaction mixture (R_G) are generally reacted concurrently. The individual components may be mixed in an upstream step and subsequently be reacted. It is also possible to feed the individual components into a reactor in which these are mixed and are then reacted.

In the method according to the invention, the individual components of the reaction mixture (R_G) are generally reacted concurrently. The reaction is preferably conducted in one stage. This means that the deprotonation of components (B1) and (B2) and also the condensation reaction between the components (A1) and (B1) and (B2) takes place