Description

[0001] The invention relates to the use of an aqueous solution of a polycondensate obtainable by

a) preparing, in a first step, an aqueous solution of a precondensate composed of: at least one compound I containing at least two amino groups, at least one aldehyde II, at least one sulphonating agent III and, optionally, one or more co-reacting agents IV;
b) converting, in a second step, the precondensate obtained in step a) into a polycondensate at a lower pH than in step a).

[0002] Such a process is disclosed in German Offenlegungsschrift 2 505 578. In particular, the latter concerns the preparation of an aqueous solution of melamine/formaldehyde condensation products containing sulphonic acid groups, in which

a) melamine, formaldehyde and an alkali-metal sulphite in a molar ratio of 1:2.8 to 3.2:0.9 to 1.1 is heated in an aqueous solution at a temperature of 60 - 80°C and a pH of 10 - 13 until sulphite can no longer he detected.
b) after adjusting to a pH of 3.0 - 4.5, heating is continued at a temperature of 30 - 60°C for 30 - 90 minutes, and
c) after adjusting to a pH of 7.5 to 9.0, the condensation product is heated at a temperature of 70 - 95°C until the viscosity has a value of 5 to 40 cP at 20°C and a solids content of 20%.

[0003] In step a), up to 40 mol% of the melamine can be replaced by urea and the molar ratio of the mixture of melamine and urea to formaldehyde is 1:2.3 to 3.2. The condensation products prepared in this way are used in the form of a solution having a solids content of 30 - 50% by weight for improving building materials, in particular as a concrete processing aid, i.e. as so-called super-plasticizer.

[0004] The preparation of super-plasticizers is also disclosed, for example, in DE-A-3 107 852, WO 91/12214, EP-A 0 326 125 and EP-A-0 336,165, as well as in the prior art which is cited in said patent publications.

[0005] According to the literature mentioned above, in the preparation of the present condensation products, all the ingredients are added to a reaction vessel during the first sulphonation phase. After sulphite can no longer be detected, condensation is carried out in an acid medium until the desired viscosity is reached and the medium is rendered alkaline in order to stop the condensation and to ensure the stability during storage.

[0006] The known processes yield products having properties which still leave something to be desired. In addition, the processes according to the prior art are still capable of improvement.

[0007] DE 3224107 relates to a process of the type as described in the preamble and relates in particular to a preparation of precursors for foam. These precursors are reactive substances which are combined with an acid catalyst, a surfactant and air to form a foam which is cured. A better storage stability of such precursors is obtained by the addition of inorganic salts such as sulphites (sulphonating agent). DE-A-3224107 discloses that no more than about 15 weight % of such sulphonating agents may be used without detrimental effects in the end product. The amount of 15 weight % corresponds with about 0.2 mol of sodium sulphite, which means that only a small part of the reactive methyl formaldehyde condensate is sulphonated.

[0008] An expedient process of the type described in the introduction was found which yields advantageous products. These advantages will be dealt with in greater detail below.

[0009] The invention relates to the u se of an aqueous solution of a polycondensate, obtainable by

a) preparing, in a first step, an aqueous solution of a precondensate composed of: at least one compound I containing at least two amino groups, at least one aldehyde II, at least one sulphonating agent III and, optionally, one or more co-reacting agents IV;
b) converting, in a second step, the precondensate obtained in step a) into a polycondensate at a lower pH than in step a),

wherein

a) in the first step, the following amounts of the reagents are used per mol of the compound I:

2.8 - 6 mol of the aldehyde II,
0.8 - 2.5 mol of the sulphonating agent III, and
0 - 3 mol of the co-reacting agent IV;

b) and in the second step, 0.1 - 1 mol of the additional amount of the compound I, again based on 1 mol of the com-