CHEMISTRY OF MOLECULAR SYSTEMS

Synthesis of polycarboxylate superplasticizers for cement-sand paste

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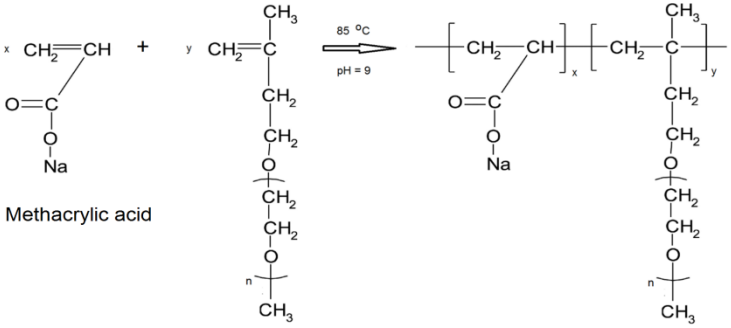
Polycarboxylate superplasticizers based on methacrylic acid and methoxylated polyethylene glycol with a molecular weight of 1000 were synthesized by the method of monomers coordination in the mixture. The influence of the obtained superplasticizers on the spreadability of cement-sand paste based on cement of Belarusian manufacturers was investigated. It was found that the effectiveness of plasticizing additives based on polycarboxylates depends significantly on their molecular weight and tricalcium aluminate content in cement.

The methoxylated methacrylic acid derivative was synthesized, with a 7 fold excess of acid, in order to shift the equilibrium of the esterification reaction towards the products, as well as to prepare a mixture for the subsequent polymerization of methacrylic acid and its ether in a ratio of 6 : 1.



The suitability of using the resulting mixture of monomers for the synthesis of polycarboxylates, by the method of radical polymerization, is shown. To determine the influence of the size of macromolecules, 5 samples were obtained, with intrinsic viscosity ranging from 0.12 to 0.91.

The effect of macromolecule size on the plasticizing ability of additives for cement-sand paste on the basis of cement of Belarusian plants was determined. It has been established that for cement with a lower content of tricalcium aluminate (4.0–4.2 %), the greatest efficiency is achieved for samples with mean sizes of macromolecules [η] = 0.27 providing an optimal ratio of the rate

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of adsorption to the content in the aqueous phase. For the cement with a high tricalcium aluminate content (8.5 %), a low molecular weight sample [η] = 0.12, which is adsorbed in the tricalcium aluminate phase, is more effective.

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Synthesis of new mesoionic tetrazolium-5-aminide

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Today there is a growing interest in tetrazole based mesoionic compounds because they are potential candidates for use as components of energetic ionic liquids [1]. Also mesoionic tetrazoles are attractive ligands for synthesis of new complexes with transition metals [2].

The purpose of this work was to develop simple method for the synthesis of new mesoionic tetrazole, namely ethane-1,2-diylbis((1,3-di-*tert*-butyl-1H-tetrazol-3-ium-5-yl)amide) (**1**) which is of interest as chelating multi-nitrogen ligand for coordination chemistry. The developed method for synthesis of **1** includes four main stages. At first, quaternization of available 5-aminotetrazole (**2**) with t-BuOH/$HClO_4$ system allowed us to obtain tetrazolium salt **3** which gave tetrazolium-5-aminide **4** under base treatment [3]. Then bis-tetrazolium salt **5** was prepared by alkylation of **4** with 1,2-dibromoethane in acetone. Finally, reaction of **5** with sodium hydroxide led to target compound **1.**

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