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A New Possibility of a Synthesis of the Using Phosphor Containing Polymers for Fixing Sands and Ground

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ABSTRACT: This article represents the updated version of the texted version on the state of environment of the Republic of Uzbekistan and on the department «Ecology» Tashkent state technical university, prepared in 2015. Its purpose is providing of the broad sections of the public and decision-makers with easy for understanding, modern and reliable environmental information.

KEY WORDS: polymer, ecology, environmental protection, pollution, syntheses, water resources, the population, Aral Sea.

I.INTRODUCTION

Nowadys an dichlorohydringliserin [DGG] is widely used for the polymers synthesis, and its high reaction ability made it possible to synthesize some epoxy polymers [1,2].

The reactions of interaction DGG with amino-units are more studied (1,3) and as a result, the polymers with high reaction activity were received, which are used as superficial active substances, high-molecular stabilizers, polymer glues, etc. In this aspect the reaction of interaction DGG with trivalent phosphorus units, which is the same according to structure of trivalent nitrogen, is much more interesting for study. We have studied the reaction of interaction DGG with triphenilphospin [TPP] which is less toxic.

The DGG before using was twice outrun (Boiling T=389 K, n_{fl}^{20}=1.4350; $JI,_{n}^{20}$=l,1807). In IR-spectrum the line of absorbtion at 2870-3000 sm^{1} 'is reliable to group (CH_2). The middle- intensively absorbing line in 850-800 sm^{1}. is relating to the valents oscillation of CC1 structure group.

In PMR - spectrum the DGG is characterized by two multiplete signals at 2,5and 2,75 m.p. This is explained by the form of these signals which is the same with the signals in PMR spectrum of propilen oxide [5,6].

The multiplete complex signal situated in more weak fields with a centre 3,45is reliable to the two proton metilen groups which are connected with chloride atom. Triphenilphosphin is the white crystals recrystalized twice before using from the mixture of ethanol and diethyl ester.

There are some absorbed zones of weak activity in IR - spectrum.

IR -, PMR - and UV- spectroscopic investigations show that this product is a linear polymer, containing guarternaryphosphonium groups in its external bonds. Accordind to potentiometric titration of the polymers water solution, the polymer contains chlor ions 10+1,0%, that is near the theoretical content of chlorions in polymer, received of equimolecular composition.

Thus the 1-st stage of the polymersization is Menshutkin reaction - the quarternization of TPP by dichlorohydringliserin.

For the investigation of TPP and DGG interaction the IR and UV-spectrums of the 1-st and final products were registered, so as PMR spectrum of the 1-st components, their mixtures during start and time.

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In the polymer IR - spectrum, made on the basis of TPP and DGGinteraction, the stripe of deformation oscillation P-Ph is in the low -frequent zone up to 1350 sm"^{1} incomparison with the zone in TPP- spectrum. This fact is explained by the low strength of P-Ph unit because of quarternizied phosphor.

The valent oscillation C- Cl unit (850 - 800 cm^{-1}) of DGG CH_2- group disappears because of formation new stripe in 1350 cm^{-1}, zone.

In the zone 1050 - 1100 cm"^{1} new intensive absorption stripes appear and they are the result of valent oscillation of the simple ester unit (C - O - C) because of the opening of epoxy – groups (1260,93 sm^{-1}) ECG during interaction with TPP. The stripe in the zone of 930 sm^{-1} is partially reserved, characterizing epoxy -groups, that was proved by the definition of epoxy number which was equal to 1,18 according to the method [7].

In PMR - spectrum of the polymer the signals of phosphonium benzene rings protons appear by 7,80 m.d. as a multiplete and protons of the qroups O - CH_2 -CH and P^+- CH_2DGG as a multiplete with a centre3,8 m.d. The groups of multiplete signals by 2,33 m.d. probably because of the polymer chains formation, in which CH and CH_2 groups are more shield than in the first components. The ratio charge of the protons signals of benzene and non - benzene rings is about 1:2,2, that practically corresponds to the proposed structure.The presence of quarternaryphosphonium group in the polymer structure was proved by UV – spectrum. So in the zone of 240 - 260 nm there are absorption stripes which are typical for the quarternaryphosphonium group. The spectrum investigation shows that the beginning of TPP and DGG interaction is the quarternization (Menshutkinreaction which involves the epoxy cycle into this one and the opening of this process leads to the receiving of the linear polymers.

The kinetic regularity of TPP and DGG interaction by dilatometrical method was received. It is proved, that efflctiveingibitors of the radical polymerization such as hydroquinone, air oxygen, stable imine oxide radicals, 2.2.6.6 -tetramethylpiperidine - 1 - oxide don't influence on the polymerization speed and that proves the non - radical character of the process. In EMR - spectrum of TPP and DGG system with different conditions the formation of radical is not seen. The influence of solvent nature on the starting speed of TPP and DGG interaction has been studied.

Thus the synthesized polymer is a powder of brown colour, stable to long storage with 428 K, the density determined by pycnometer method is 1,388 g/cm^3, it is solved in dymethilphormamid, ethanol, methanol, water and in the other polar solvents. The study of viscosity proved that it is the typical polyelectrolyte and the dependence of c/n from c for water solvents of the synthesized polyelectrolytes is of linear character which proves that water solvents behavior is described by Fuoss - Strauss equation [9].

The dependence of polymer solution viscosity on the concentration of phosphonium polymers in the presence of strong electrolyte 0,25 KC1 solution is of straight - line character, because of creation screen "fur coat " anti-ions around macro-molecular ions.

The molecular mass of polymers was determined by the method of high - speed sedimentation using the equation of Flory -Mandelkernwhich was equal to 39000.

Thus on the basis of kinetic, spectral and chemical methods was studied the reaction of interaction DGG and TPP and supposed polymerization process was shown, that is able to receive the catione polyelectrolyte, contained in the side chains the quarterized groups.

The brief characteristic of the causes of occurrence of problems and description of actions on their elimination is given in this report. The article is based on the official statistical information, materials of the Ministry of Natural Resources and Environmental Protection of the Republic of Uzbekistan [10].

Today these lands are either water logged or salinized. Former arid soils of the Pre-Aral area with automorphic feed and moisture regime became meadow-swamp soils with hydromorphic regime. To support this regime artificially it is necessary to raise standards by 2-3 times, in order not to activate the secondary salinization process. A vicious circle of agriculture was formed in this region, where heavy swamped lands are left. The land-improvement condition of irrigated soils in Central Asia is worsened by collective-drainage water saturated with pesticides and discharged as return runoff into numerous local landscape depressions. As a result, artificial reservoirs-accumulators appear. These reservoirs are a real disaster for surrounding lands. Some of them cause secondary pollution when poisonous bed depositions become dry and are brought on irrigated lands, ruin them and pollute the atmosphere in the surrounding regions. It is shown that the basis of the proposed method of fixing salted sand complex additions is the rocess of translation their surface layers (up to 5cm) from the free dispersed state to the connected-dispersed by forming a structure (crust), consisting of a water-macro aggregates - particles> 2,5 mm, having mechanical strength (to 4,0 MPa). Optimal conditions for the composition of additives, hardeners exhibit the maximum effects of action, as well as the procedure for their introduction into the sand. It

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is found that a composition consisting of 0,32kg/m^2 sawdust and 0,014kg/m^2 GSK (calculated on a dry product that provided using a 0,8% solution) is considered optimum and promotes crust having a sufficiently high strength about 2,4 MPa, and the amount of water-resistant aggregates (> 0,32 mm) in the structure with equal 72,43% vs. 7,36% in the original. Using obtained based on a dilute solution (0,075%) waste "Maxam-Ammophos" AC — 16% solution of phosphor containing in combination with a dilute (0,05%) with a solution of 17%.

In agriculture there is a steady tendency to transition to ecological management of production. One of the main principles of the above mentioned tendency is maintenance of positive humus balance in soil at the expense of introduction of alternation of crops and application of organic fertilizers.

For the decision of the set forth above problems of economy of our republic on department «Ecology and life protection» Karakalpak state university and Tashkent state technical university, the centre of science on maintenance of ecological and industrial safety of the Central Asian global environmental problems and industrial enterprises of all branches of our republic is created. The centre of science renders the necessary competent and practical help at the decision of various problems both natural, and ethnogeny character, and also develops necessary recommendations under their decision.

We believe that researchers not only be connected with researchers of Uzbekistan, but our academic collaboration will form the foundation of one of the most important scientific projects to solve the environmental problems that threaten a lot of population in whole Central Asia and even the whole globe.

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