

USE OF IONIC LIQUIDS IN SYNTHESIS OF PHOSPHORUS BASED POLYMERS

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Now introduction of cleaner technologies is one of priority directions both for a science and for the industry. Red phosphorus, being one of the well-known allotropic modifications of elemental phosphorus, is now being defined as a three-dimensional inorganic polymer with homo-chains P-P. It is known that the reaction conditions, the properties of the solvent, additives, etc., may lead to drastic changes in the rate of polymorphic transformation. The evidence exists confirming the fact that the polymerisation of white phosphorus might be initiated by intermediates of different nature.

The object of our research is the radiation-induced polymerisation of white phosphorus in the presence of ionic liquids (IL). The ionic liquids are known to catalyze reactions involving ionic intermediates. We have investigated the role of ionic liquid on the polymerisation of white phosphorus in dimethylsulfoxide (DMSO) solution. 1-ethyl-3-methylimidazolium bis(trifluoromethanesulfonyl)imide was taken in the equi-molar quantities to white phosphorus. The presence of IL leads to the considerable

acceleration of the radiation-induced polymerisation of white phosphorus in DMSO.

Based on the NMR P^{31} data we proposed the formation of the intermediate $[P_4-IL]$, its rate constants in the reactions with the products of DMSO radiolysis being higher than those of white phosphorus. It is found that in the presence of IL the white phosphorus is completely converted into the phosphorus-based polymer, compared to 40% conversion under the same conditions but in the absence of the IL.