

INVESTIGATION OF THE REACTION OF POLY(1,4-BENZOQUINONEDIIMINE-*N,N'*-DIYL-1,4-PHENYLENE) WITH HYDRAZINE

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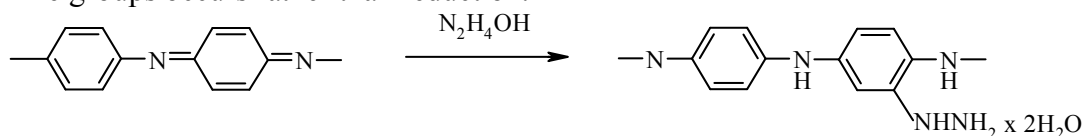
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Poly(1,4-benzoquinonediimine-*N,N'*-diyl-1,4-phenylene) (PBQIP) was synthesized by new one-step method based on the oxidative condensation of p-phenylenediamine with potassium persulphate in organic medium [1].

It is known, that pernigraniline type polymers could be reduced to other forms of polyaniline - leucoemeraldine and emeraldine. We carry out the reduction of PBQIP by hydrazine hydrate being the commonly used reducing agent for the reduction of emeraldine [2]. According to UV spectroscopic data all quinonediimine groups were converted to aminophenyleneaniline groups under the action of hydrazine hydrate.

Obtained polymer was oxidized aiming to obtain polymer with analogous to emeraldine structure. However, the conductivity of obtained polymer after doping with 3 N hydrochloric acid was only 1.3×10^{-7} S/cm. Therefore leucoemeraldine was not formed as a result of reduction of PBQIP. To elucidate the causes of obtained data the reaction of model compound *N,N'*-bis(4'-aminophenyl)-1,4-benzoquinonediimine with hydrazine hydrate was investigated as well. According to ¹H NMR data 1,4- addition of hydrazine to quinonediimine groups occurs rather than reduction.



Obtained polymer (compound 1) has been doped with different molar ratio of 0.23 N J₂ solution. We studied the dependence of electrical conductivities of PBQIP and compound 1 upon doping level with iodine. On both cases, as doping level was increased, the increase in conductivities was observed. According to obtained data doping level in all cases is higher for compound 1. It can be deduced, that the treatment of compound 1 powder with iodine involves its oxidation according to the following scheme. Conductivities of doped compound 1 samples measured at room temperature on the next day after heating to 358 K increases. When doping the PBQIP and compound 1 with iodine, the electrical conductivity of the polymer increases from $<10^{-10}$ to 5×10^{-5} S/cm and from $<10^{-10}$ to 5.7×10^{-4} S/cm, correspondingly.

References

1. Durgaryan A.H., Durgaryan N.A., Arakelyan R.H., Martikyan N. Sh., Patent RA 2849, 25.06.2014.
2. Xing-Rong Zeng a and Tze-Man Kob, , Polymer; **39**(5, 1181-1295, 1998.