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Effect of Radiation on the Persistent Length of a Chain

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Abstract: The effect of radiation on the persistent length of a chain in a water solution of polymer is considered in the work. This effect is suggested to be related to the breaking of the hydrogen bonds in hydrate layers around the chain. The kinetic equation of the breakage of the hydrogen bonds is defined and the stationary solution is found with the help of the equation. The expression of average value of the persistent length of the chain at a fixed average number of broken bonds is determined by means of the Poisson distribution. We found that the persistent length of the chain at irradiation is smaller than that of one without irradiation. Therefore we suggest that this effect of the ``softening'' of conformations by irradiation which breaks hydrogen bonds has to be revealed experimentally in situations where macroeffects depend on the persistent length of the chain.

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