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Potential Effect of Ammonium Chloride on the Optical Physical Properties of Polyvinyl Alcohol

ABSTRACT:

The preparation of facile convertible and degradable polymers has received great attention due to their applications in the fields of environmental protection, pharmaceutical industry, and public health. In this work, five samples were prepared by adding the ammonium chloride salt to the polyvinyl alcohol polymer in various ratios including 0.4, 0.8, 1.5, 3, and 6%. The photo-sensitivity study was conducted on the prepared samples utilizing UV light at 356 nm at the following time intervals: 0, 7, 14, 28, and 42 hours. The degradation process was followed up spectroscopically using UV/Vis and FTIR spectrophotometers. This was carried out by calculating many physical and chemical parameters, which are: the absorbance, functional group coefficient, optical partition, optical segmentation rate constant, average molecular weight, average quantum yield of the main chain scission, and degree of partition. The results indicated that the degradation rate constant and the growth factors of the carbonyl and hydroxyl functional groups were directly proportioned to the adding concentration of ammonium chloride salt as well as the time of irradiation. It is concluded that the addition of this salt may prevent the polymer from undergoing the polymerization process, reduce the polymeric half-life, and protect the environment from the risk arising from the polymer's stability. Also, this environmentally friendly salt may be considered as a potential additive to improve the applications of polyvinyl alcohol polymer in various fields.