



Synthesis, characterization and thermal behavior of 2,2'-dihydroxybiphenyl-formaldehyde-phenylenediamine copolymer

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ABSTRACT

Polymer 2,2'-BPPHDF-III was synthesized by polycondensation of the monomers 2,2'-dihydroxybiphenyl (BP), phenylenediamine (PH) and formaldehyde (F) in the molar proportion [3:1:5] in an acidic medium. Copolymer syntheses and structure have been controlled by elemental analysis, Number average atomic weight of copolymer was controlled by conductometric titration in non-aqueous medium, FTIR, ¹H NMR and the SEM studies of copolymer was examined by scanning electron microscopy (SEM). The studies have been additionally reached out to TGA for assurance of their method of disintegration and relative thermal behaviour. Actuation energy (E_a), order of reaction (n), and frequency factor (z) were determined by Sharp-Wentworth and Freeman-Carroll techniques. Actuation energy determined by Sharp-Wentworth and Freeman-Carroll techniques are in close concurrence with one another. Copyright © 2022 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the Polymer & Mediterranean Fiber International Conference'2021.

1. Introduction

Investigation of warm examination includes a gathering of strategies wherein an actual study of material is estimated as a component of temperature when the substance is exposed to a controlled temperature. Since the advanced history of TGA, warm debasement of polymers and the investigation of their energy have been at the focal point of warm examination. Numerous scientists attempted to work on the warm security at raised temperature by change of the monomer creation in polymer synthesis [1].

The investigation of copolymer has turned into a subject of late revenue, being a significant property, which essentially chooses warm dependability and processability. A wide assortment of thermally stable polymers have been integrated and contemplated, their TGA property and finds numerous applications, for example, particle exchangers [2–5], semiconductors [6], high dielectric steady for energy stockpiling capacitors [7], bundling, glues and coatings in electrical sensors, activators, impetuses and thermally stable materials [8–10]. Michael et al. done warm debasement of terpolymers integrated from salicylic corrosive/8-

hydroxyquinoline and guanidine with formaldehyde [11–13]. Phenolic tars are known for their wide applications in different regions in view of their warm security, simple accessibility, cost adequacy, and a portion of their fantastic properties [14]. The warm steadiness of copolymers has been widely concentrated by utilizing the technique for thermogravimetric investigation (TGA) by a few creators. Thermo scientific and dynamic investigations of terpolymer pitches got from 8-hydroxyquinoline-5-sulphonica cid/p-cresol, oxamide/melamine with formaldehyde have been revealed by Singru et al. [15–18]. 2-hydroxy, 4-methoxybezophenone, 1,5-diaminonaphthalene, formaldehyde by Das [19] has been concentrated exhaustively. Techniques for the assessment of active boundaries from thermogravimetric examinations are by and large dependent with the understanding that the Arrhenius condition is substantial with warm and dissemination obstructions being irrelevant. Different examinations on union, portrayal and thermogravimetric investigation of a few new polymeric pitches have been accounted for [20–21]. Thus, in the current examination, it has been arranged to consider the TGA investigation of terpolymer got from 2,2'-dihydroxybiphenyl, phenylenediamine and formaldehyde which has not been accounted for so far.

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