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# Synthesis and Characterization of 2-Amino 6-Nitrobenzothiazole-Adipamide-Formaldehyde Copolymer

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**Abstract:** *The copolymer ANBAF-II was made via condensation of 2-amino 6-nitrobenzothiazole, adipamide and formaldehyde in the presence of 2M HCl as a catalyst at 126 $^0$C in a 2:1:3 molar fraction of reactants. The structure of a newly synthesized copolymer has been elucidated and demonstrated using the concept of elemental evaluation and a variety of spectrum techniques, including UV-Visible, FT-IR, and $^1$H NMR. The non-aqueous conductometric titration was used to determine the range of common molecular weight of the copolymer. The structure of the copolymer has been provided based on the idea of spectral and physicochemical evaluation.*

**Keywords:** Copolymer, condensation, spectral analysis, NMR spectra, Non-aqueous, Number average molecular weight.

## I. INTRODUCTION

Functional polymers are used as simple inputs in generating substances along with plastic, rubber, fiber, paint, and adhesive because of their mechanical and technical homes [1]. The amendment affords the possibility to alternate and enhance the bodily and chemical homes of polymers within side the favored direction. For this reason, polymer amendment has end up one of the maximum essential subjects in lots of studies laboratories and industries [2]. Copolymer has been attracting plenty interest of polymer chemist because of thrilling advanced homes that may satisfy the call for of contemporary-day society [3]. Since remaining decades, emphasis has been given on synthesis of thermally solid polymeric resins with regard low manufacturing value and simplicity of manufacture. The thermal degradation examine of copolymer which more often than not comes to a decision the thermal balance, process ability and essential facts approximately its realistic applicability. A big wide variety of copolymers were synthesized and locate many packages along with adhesives, packaging, coating in electric sensors, catalyst, activators, thermal solid substances, ion-exchangers [4, 5], excessive dielectric regular for strength garage capacitors [6] and semiconductors [7].The sizable have enough money has been made to enhance the exceptional of copolymer both with the aid of using advent of a whole lot of practical monomers or with the aid of using enhancing methods. The thermal balance of copolymer were studied with the aid of using the usage of the technique of thermo gravimetric analysis (TGA) with the aid of using numerous authors [8-15].

Thermal degradation of copolymer derived from 2-aminothiophenol, hexamethylenediamine with formaldehyde [16]. Synthesis and thermal degradation research of melamine formaldehyde resin has been stated through S. Ullah et al [17]. The thermal conduct of newly synthesized copolymer derived from salicylic acid and thiosemicarbazide has been studied through Kamlakar et al [18]. A. Gupta and coworkers studied the thermal degradation and kinetics of terpolymer resin derived from p-hydroxybenzaldehyde, succinic acid with ethylene glycol [19]. Thermogravimetric evaluation of terpolymer resin derived from salicylic acid, hexamethylenediamine with formaldehyde through Das et al [20], 8-hydroxyquinoline and formaldehyde through Rathod et al [21] and salicylic acid, diaminonaphthalene with formaldehyde through Nandekar K. A. [22] had beenstated. The observe of non-isothermal decomposition and kinetic evaluation of 2,4-dihydroxybenzoic acid, melamine-formaldehyde copolymer has been stated through Butoliya et al