New Heteroaromatic Polyazomethines Containing Naphthyridine Moieties: Synthesis, Characterization, and Biological Screening

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Abstract:

A new series of heteroaromatic polyazomethines containing 1,8-naphthyridine moieties in the polymer backbone were synthesized with a solution polycondensation technique. A new heteroaromatic monomer containing 1,8-naphthyridine moieties (4-ethoxy-2,7-dicarboxaldehyde-1,8-naphthyridine) was synthesized with an analogous synthetic sequence and confirmed by elemental and spectral data. The resulting polymers were characterized by elemental, spectral analyses, solubility and viscometry measurements. All the synthesized polyazomethines had better solubility in polar aprotic solvents. The thermal properties of those polymers were evaluated by thermogravimetric analysis, differential thermogravimetry, and differential thermal analysis measurements and correlated to their structural units. All the polymers had nearly similar maximum polymer decomposition temperatures, which were in the range 557–577°C. A very large difference between the glass transitions (92–222°C) was observed. In addition, with gel permeation chromatography, the molecular weight determination of selected examples of those polymers was evaluated. The values of the average molecular weight for polyazomethines 7b and 7c were 34,914 and 24,859, respectively. On the other hand, the biological screening of all of the synthesized polyazomethines was performed in variety of bacteria and fungi. Most of the polyazomethines showed a significant influence against Gram-negative bacteria. The minimum inhibitory concentration of the most active polymers was 0.05 mg/mL. VC 2012 Wiley Periodicals, Inc. J Appl Polym Sci 126: 2–12, 2012

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