

Synthesis and characterization of new polyaspartimides derived from bis(3,5-dimethyl-4-maleimido phenyl)-3'-pyridyl methane and various aromatic diamines

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ABSTRACT: A new aromatic bismaleimide containing pyridine unit, bis(3,5-dimethyl-4-maleimidophenyl)-3'-pyridyl methane was synthesized from bis(3,5-dimethyl-4-aminophenyl)-3'-pyridyl methane and maleic anhydride by the usual two-step process that included ring-opening (addition reaction) to give bismaleamic acid, followed by cyclodehydration to give bismaleimide. The monomer was characterized by elemental analysis, FT-IR, ¹H-NMR and ¹³C-NMR. In addition, a series of polyaspartimides containing a pyridine unit in the polymer backbone were prepared by the polyaddition of this bismaleimide and various aromatic diamines via Michael addition reaction in N,N-dimethylformamide (DMF) in a 1:1 molar ratio. The yield as well as the molecular weight of the polymers increased with reaction times upto around 98hrs. These polymers had number-average molecular weight (M_n) and weight-average molecular weight (M_w) in the range of 10,452 to 13,052 and 17,386 to 26,396 respectively. The polyaspartimides were characterized by elemental analysis and FT-IR. All the polyaspartimides are soluble in various organic solvents such as NMP, DMAc, DMF, DMSO, etc. The glass transition temperatures (T_g) of the polyaspartimides were in the moderate range of 168-240°C. The $T_{10\%}$ (10% weight loss temperature) is in the range 492-527°C and the residual weight 47.08-51.61% at 998°C in nitrogen atmosphere.

Keywords: Polyaspartimides; Bismaleimide; Aromatic diamines; Michael addition.

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