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Synthesis of Biobased Polyamide: Poly(alkylene -2,5-furandiamide)

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Polymerization of dimethyl -2,5-furandicarboxylate (FDCE) and aliphatic diamine series including ethylenediamine, 1,4-butanediamine, 1,6-hexamethylenediamine, and 1,8-octanediamine was carried out in the absence of catalyst using melt polymerization method. Reaction was conducted under nitrogen pressure. The effect of ethylene segment on polymer formed was carefully investigated. Amorphous polymer was formed for ethylenediamine, 1,6-hexamethylenediamine, and 1,8-octanediamine, which its polymer has no Tm, while 1,4-butanediamine one showed Tg and Tm value clearly. Intrinsic viscosity (IV) of each was also analyzed, shows that longer carbon number on diamine lowering polymer IV value. Thermal degradation temperature was investigated using TGA. Polymer chemical structure was characterized using 1H NMR.