Supplementary Information

Heteroaromatic polyamides with improved thermal and mechanical properties

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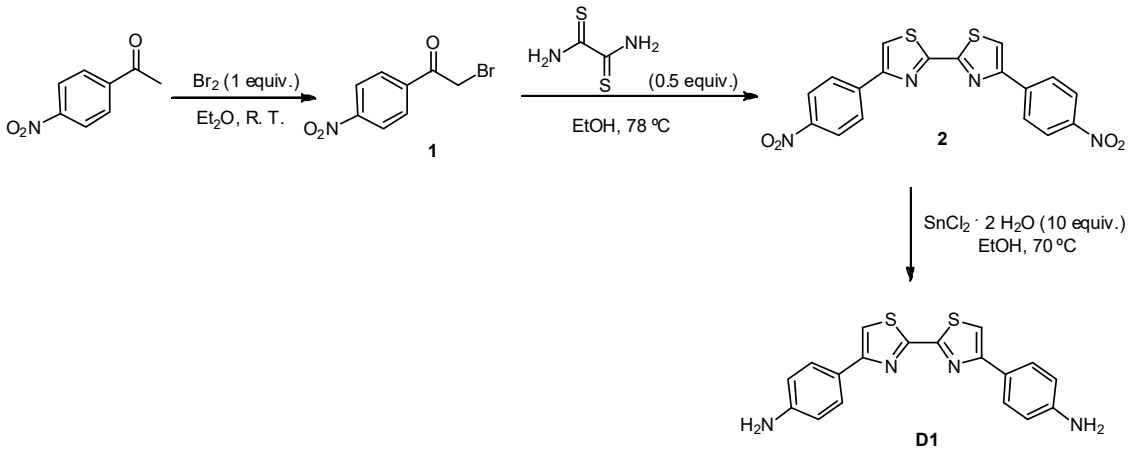
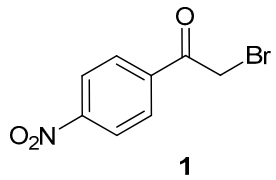
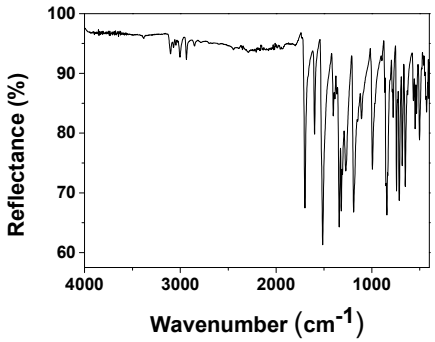
S1. Synthesis and characterization of diamine D1 and intermediates



Characterization of 2-bromo-1-(4-nitrophenyl)ethan-1-one (1):

a)





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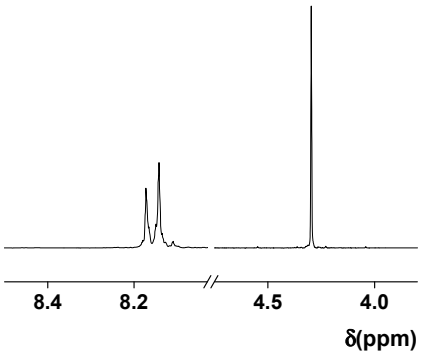

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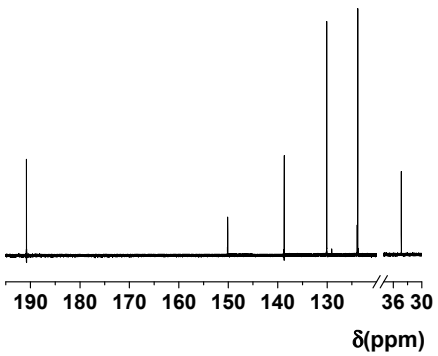
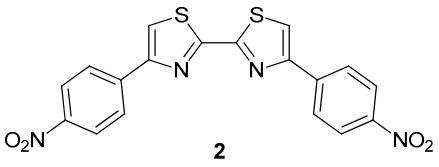


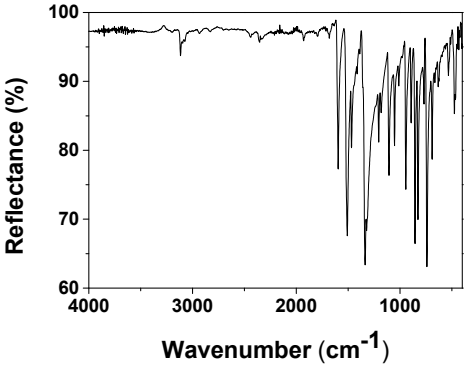
Figure S1. Characterization of **1** by (a) FTIR, (b) ^{1}H NMR, and (c) ^{13}C NMR.

Characterization of 4,4'-bis(4-nitrophenyl)-2,2'-bithiazole (2):



2

a)



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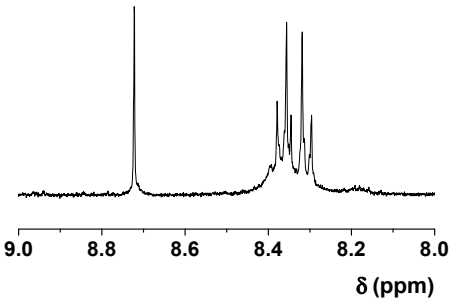


Figure S2. Characterization of **2** by (a) FTIR, (b) ^{1}H NMR.

Characterization of the monomer 4,4'-([2,2'-bithiazole]-4,4'diyl)dianiline (D1):

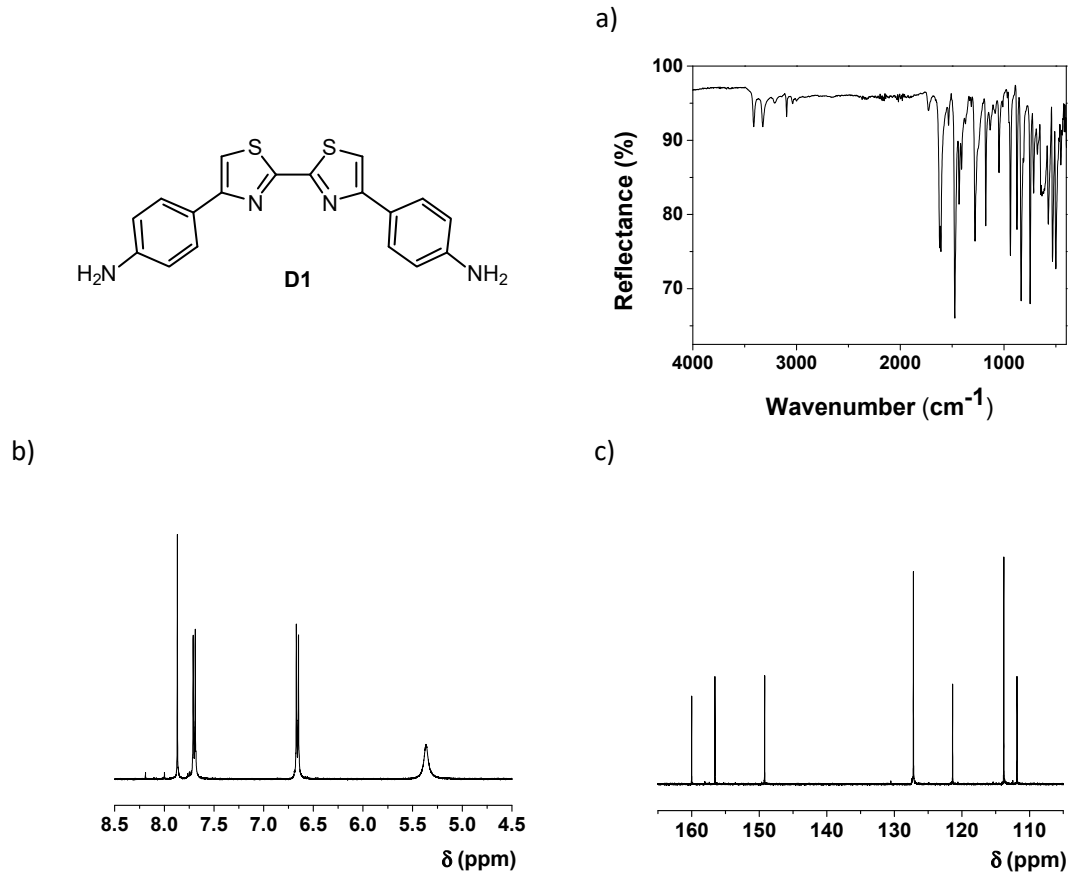
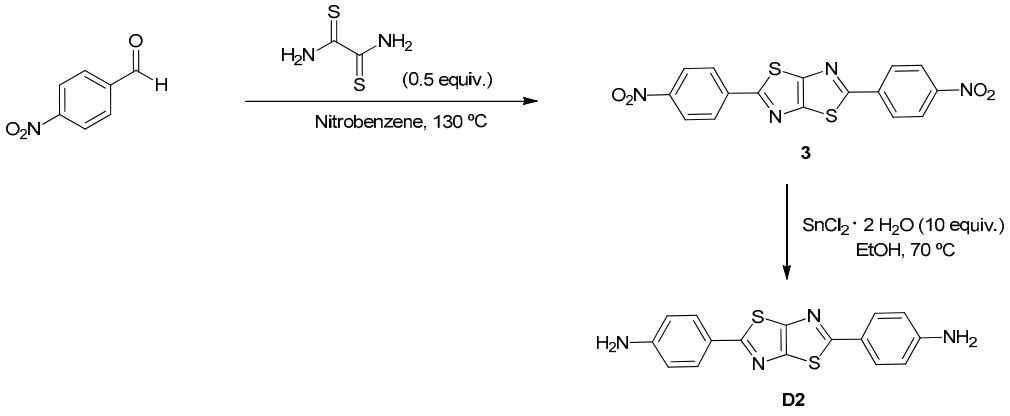
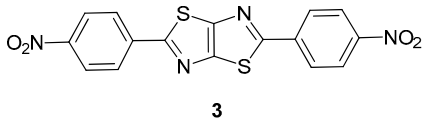


Figure S3. Characterization of **D1** by (a) FTIR, (b) ^{1}H NMR, and (c) ^{13}C NMR.

S2. Characterization of diamine D2 and intermediate



Characterization of 2,5-bis(4-nitrophenyl)thiazolo[5,4-d]thiazole (3):



3

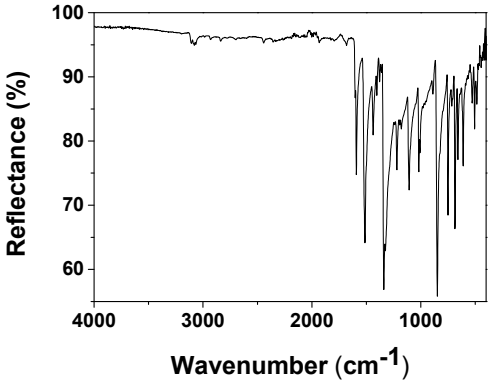
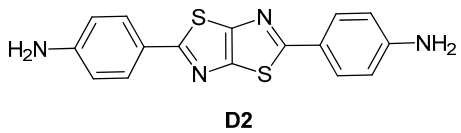


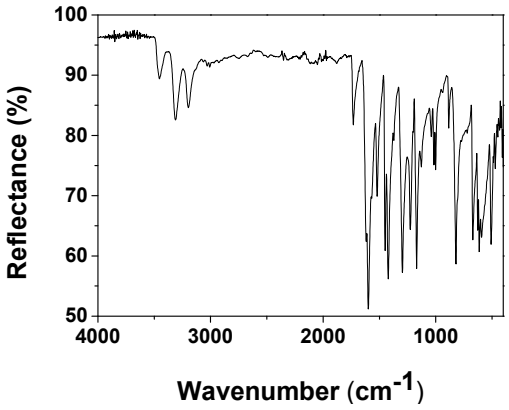
Figure S4. Characterization of **3** by FTIR.

Characterization of the monomer 4,4'-(thiazolo[5,4-d]thiazole-2,5-diyl)dianiline (D2):



D2

a)



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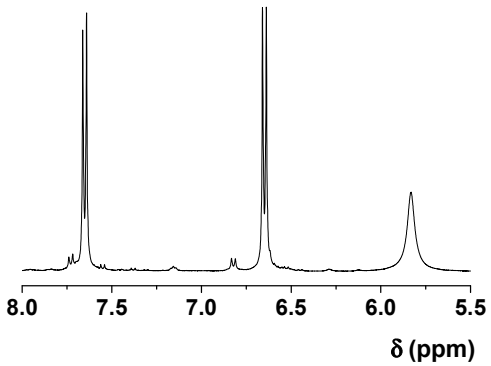

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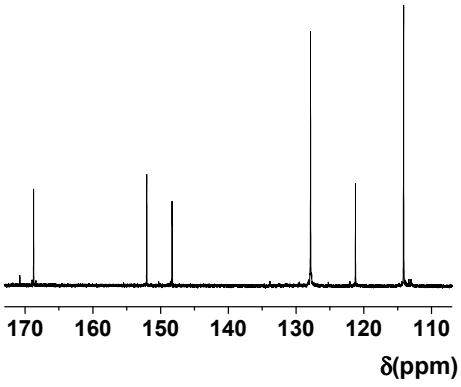
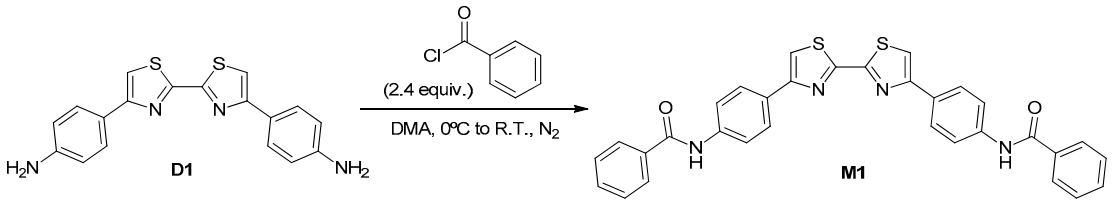


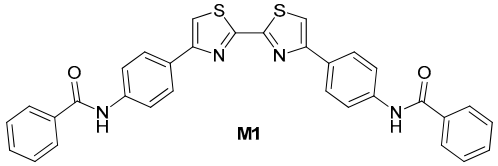
Figure S5. Characterization of **D2** by (a) FTIR, (b) ^{1}H NMR, and (c) ^{13}C NMR.

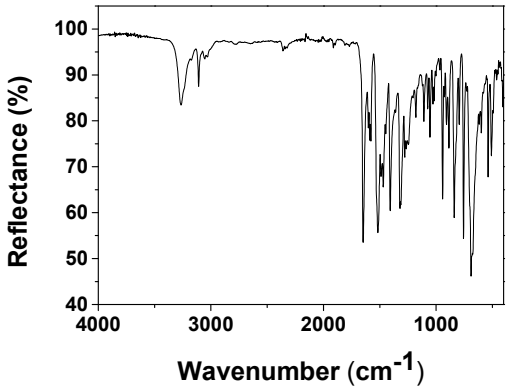
S3. Characterization of model polyamide M1



Characterization of N,N'-([2,2'-bithiazole]-4,4'diylbis(4,1-phenylene))dibenzamide (M1):

a)





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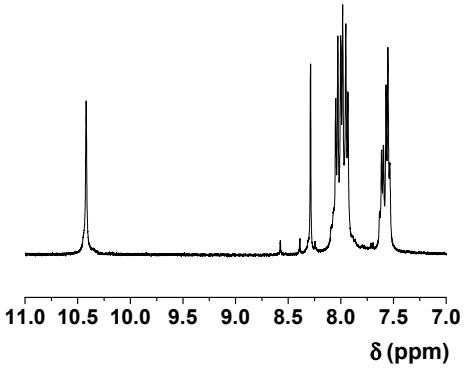

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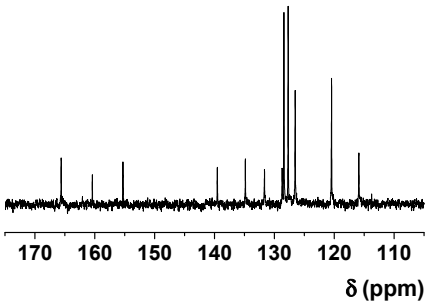
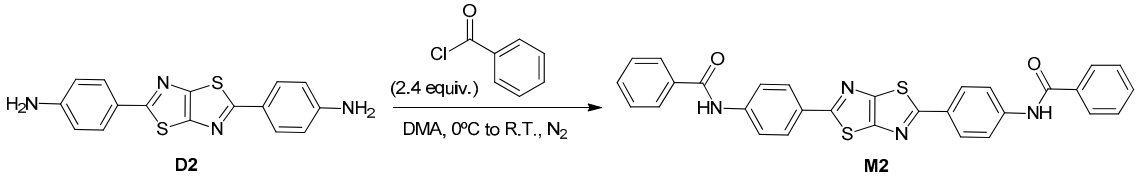


Figure S6. Characterization of **M1** by (a) FTIR, (b) ^{1}H NMR, and (c) ^{13}C NMR.

S4. Characterization of model polyamide M2



Characterization of N,N'-(thiazolo[5,4-d]thiazole-2,5-diylbis(4,1-phenylene)) dibenzamide (M2):

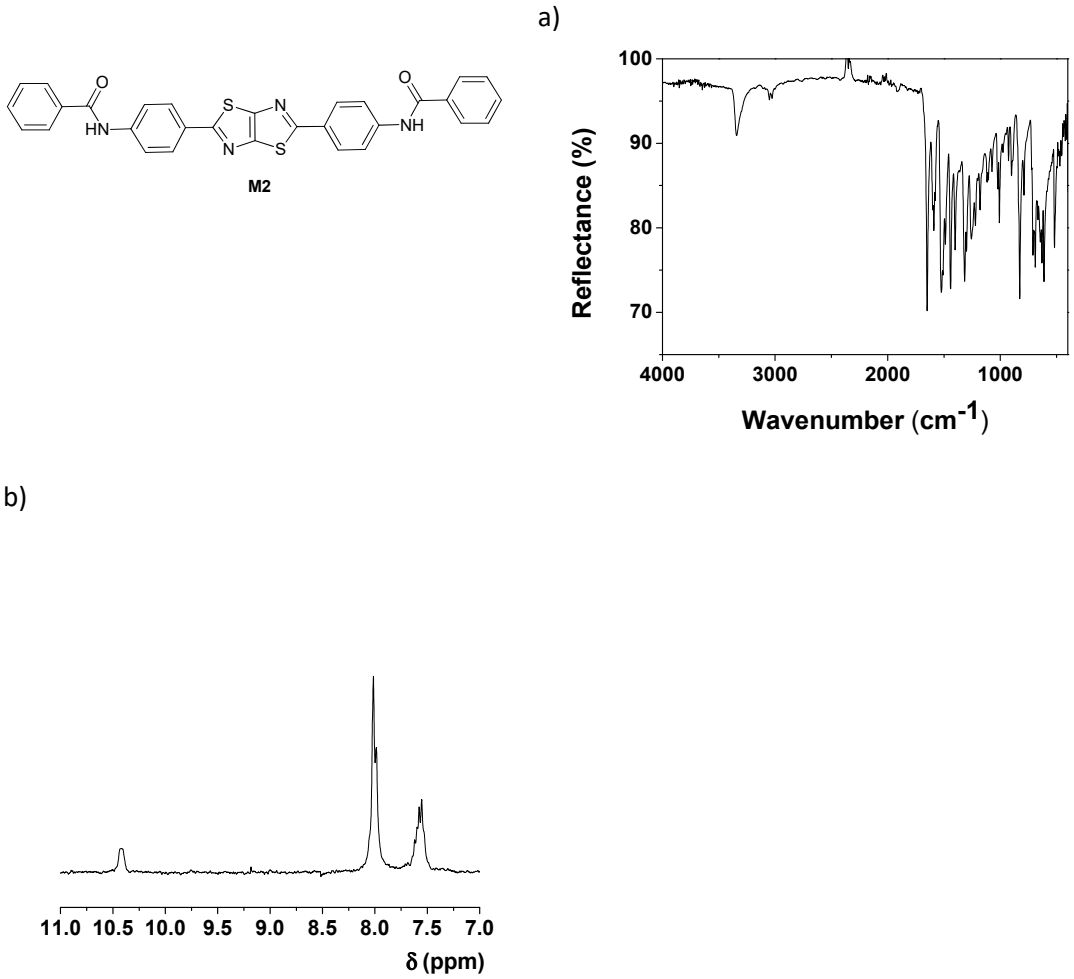


Figure S7. Characterization of **M2** by (a) FTIR, (b) ^{1}H NMR.

S5. Characterization of copolymers CP1 and CP2

Characterization of CP1:

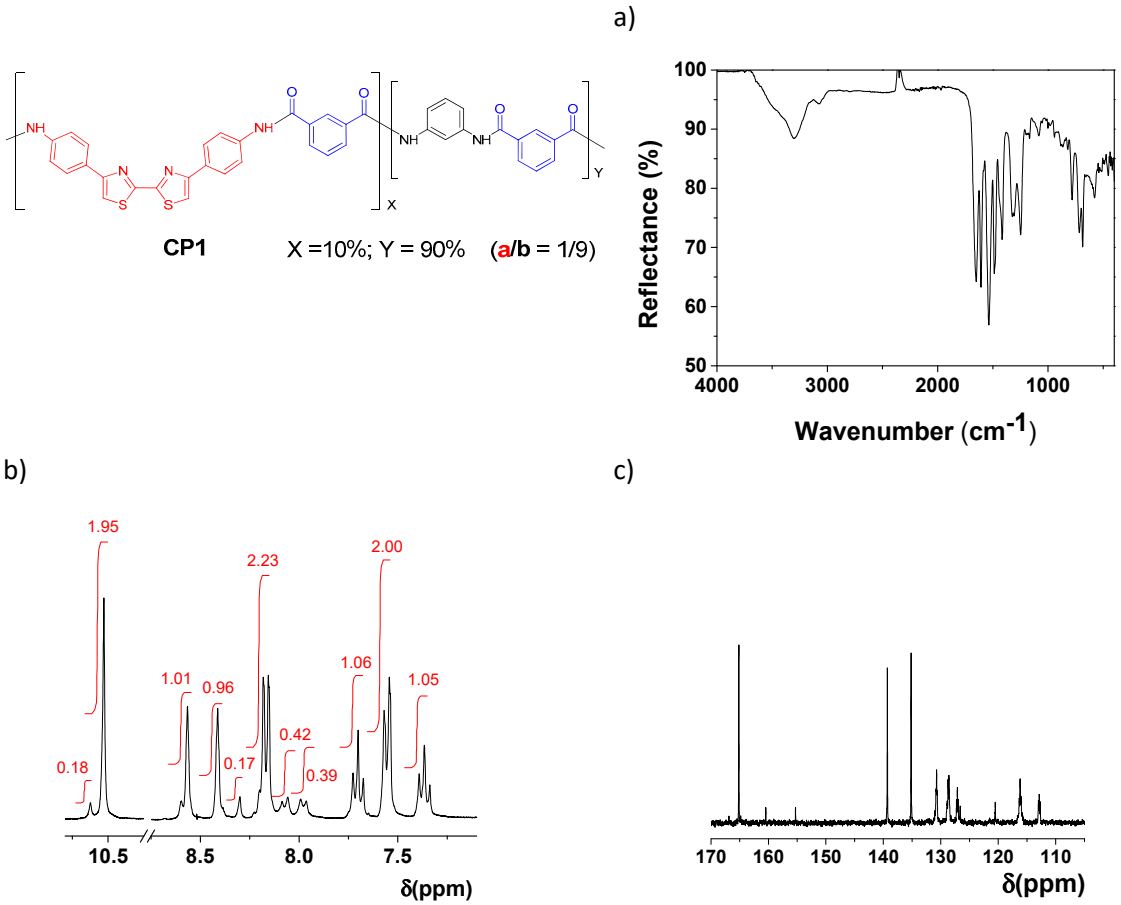


Figure S8. Characterization of **CP1** by (a) FTIR, (b) ^{1}H NMR, and (c) ^{13}C NMR.

Characterization of copolyamide CP2:

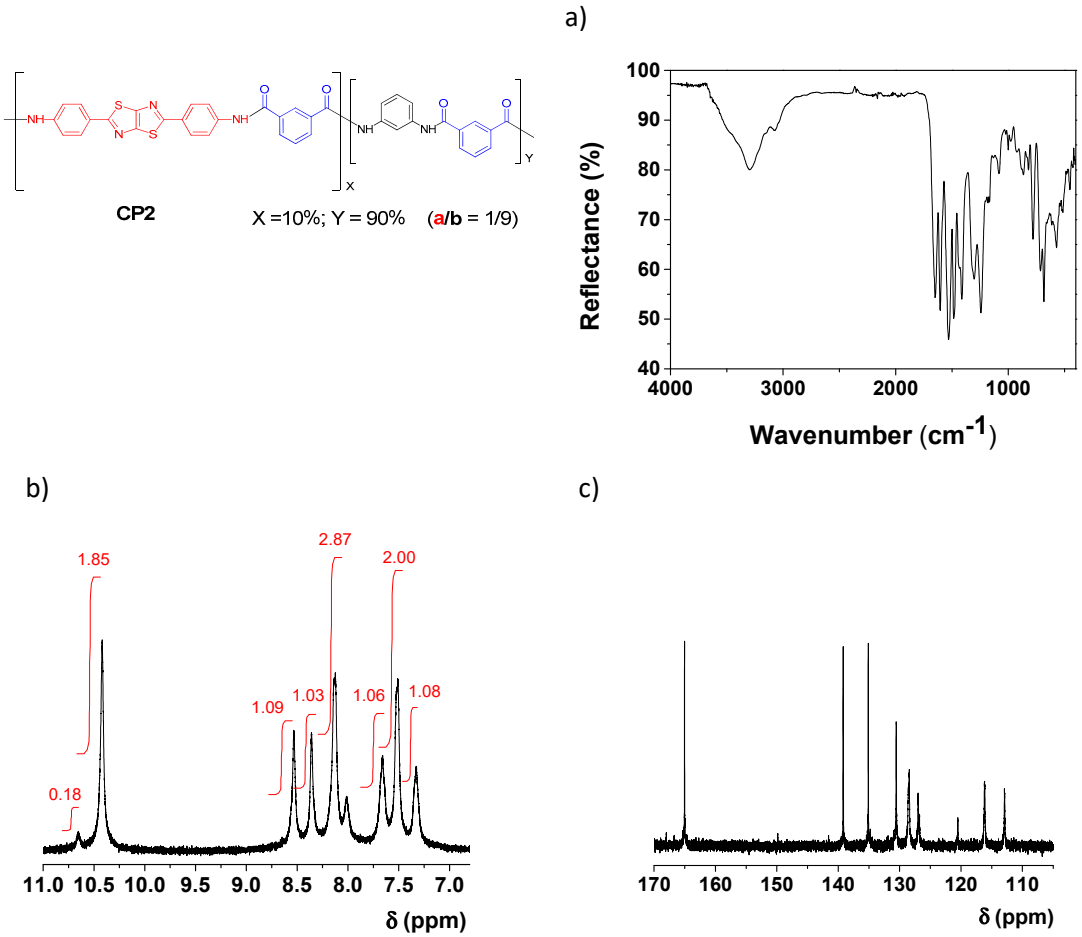


Figure S9. Characterization of **CP2** by (a) FTIR, (b) ^{1}H NMR, and (c) ^{13}C NMR.

Characterization of reference polyamide poly(m-phenylene isophthalamide):

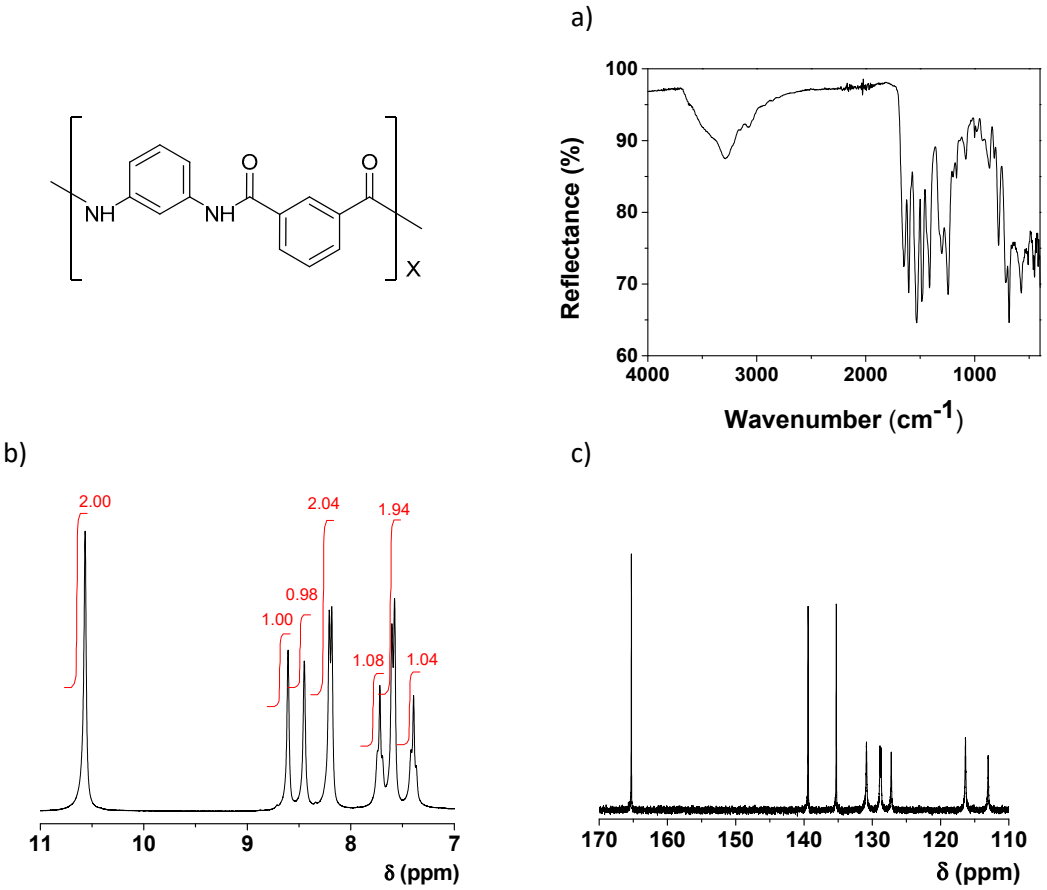


Figure S10. Characterization of reference polyamide poly(*m*-phenylene isophthalamide) by (a) FTIR, (b) ^{1}H NMR, and (c) ^{13}C NMR.

S6. Mechanical properties of polyamide films

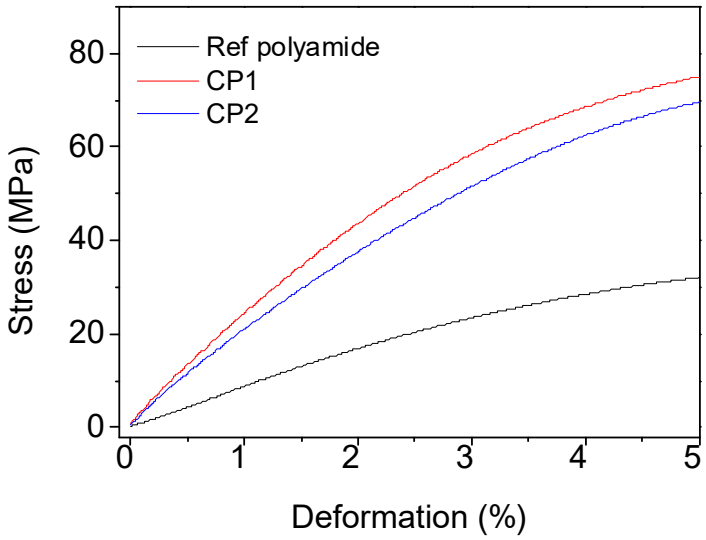


Figure S11. Representative stress-strain patterns of copolyamides **CP1**, **CP2**, and reference polyamide poly(*m*-phenylene isophthalamide). The graph has been enlarged at the initial deformation values to show the differences in the Young's Modulus.

S7. Thermogravimetric analysis of polyamides

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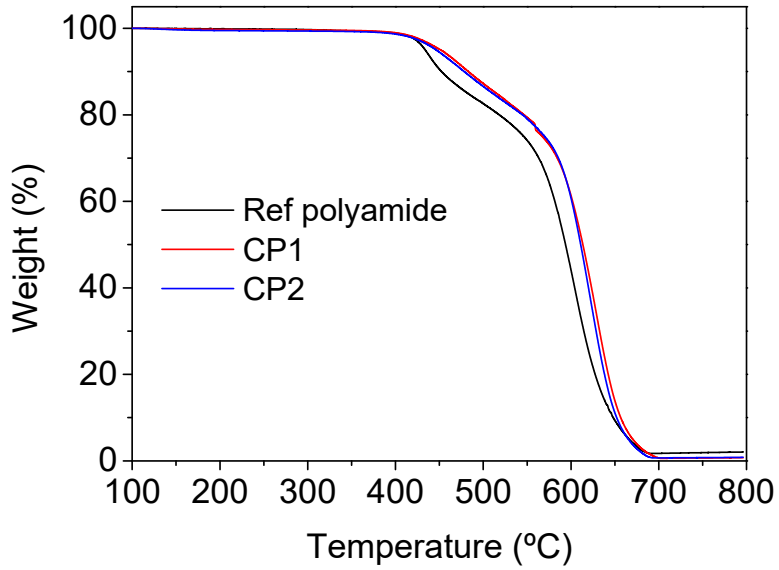

b)

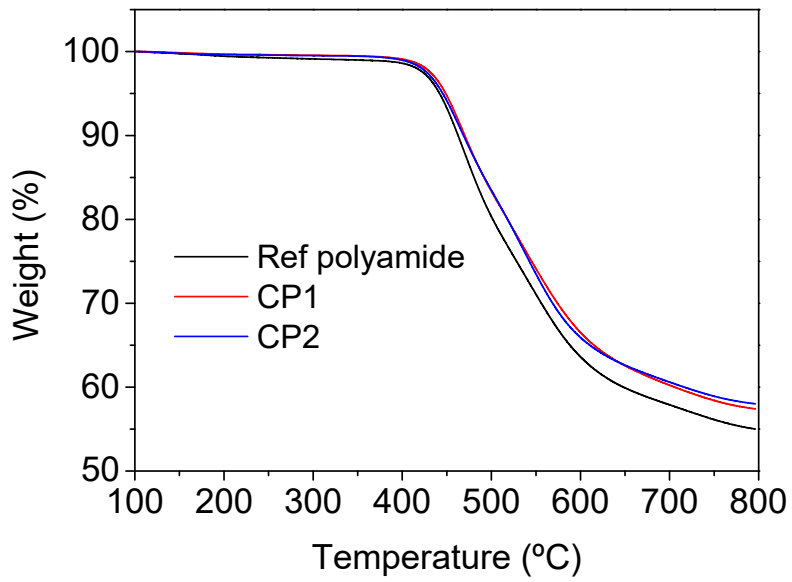

Figure S12. Thermogravimetric analysis of copolyamides **CP1**, **CP2**, and reference polyamide poly(*m*-phenylene isophthalamide) under a) synthetic air atmosphere, and b) nitrogen atmosphere.