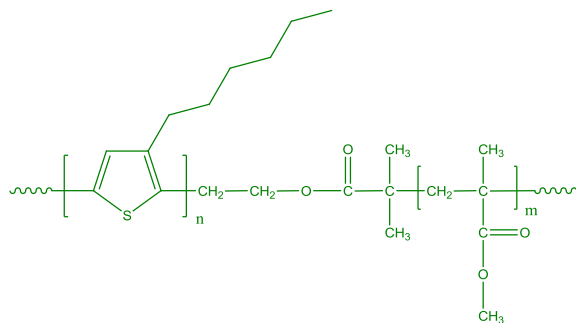


Sample Name: Poly(3-hexyl thiophene-b-methyl methacrylate)

Sample #: P6778-3HTMMA

Structure:

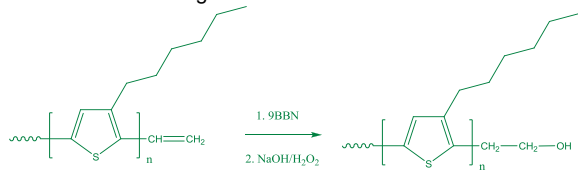


Composition:

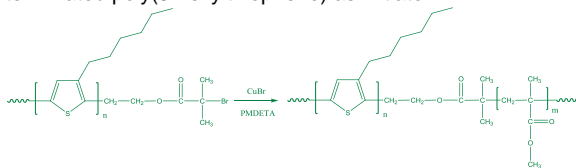
Mn x 10 ³ (3HT-b-LA)	PDI	Regioregularity of P3HT
15.0-b-85.0	1.9	~90% (H-T)

Synthesis Procedure:

1. Hydroxy terminated poly(3-hexylthiophene):
Hydroxy terminated poly(3-hexylthiophene) was prepared according to literature, the brief synthetic procedure as following:



2. Block copolymer:
MMA was polymerized by ATRP with bromide terminated poly(3-hexylthiophene) as initiator.



3. Purification of polymer:

The crude polymer was recovered from reprecipitation into methanol. The inorganic salts were removed by using a Soxhlet extraction with Methanol and homopoly hexyl thiophene was removed by extraction with hot cyclohexane. The pure polymer was dissolved in chloroform and precipitated in cold acetone

Characterization:

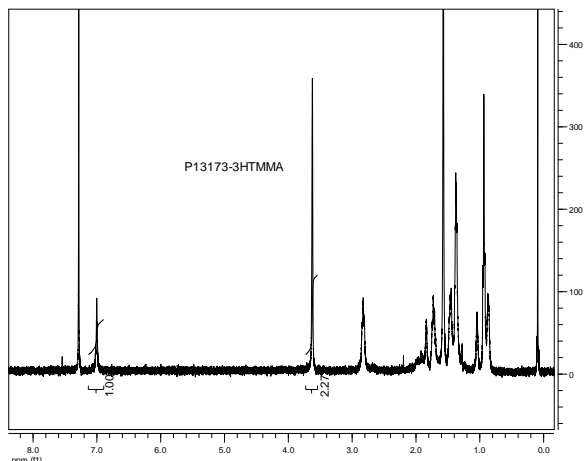
The molecular weight and polydispersity index (PDI) are obtained by size exclusion chromatography (SEC) in THF or Chloroform. SEC analysis was performed on a Varian liquid chromatograph equipped with refractive and UV light scattering detectors. Three SEC columns from Supelco (G6000-4000-2000 HXL) were used with triple detectors

from Viscotek Co. The molecular weight is calculated based on polystyrene standards. The NMR spectrum was recorded in deuterated chloroform to determine the functionality and the composition of copolymer.

Solubility:

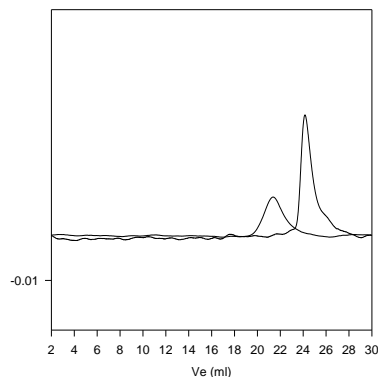
Poly(3-hexyl thiophene-b-MMA) is soluble in THF, Toluene and CHCl₃. It precipitates from methanol and hexane.

H NMR of hydroxy terminated poly(3-hexylthiophene):



SEC profile of polymers:

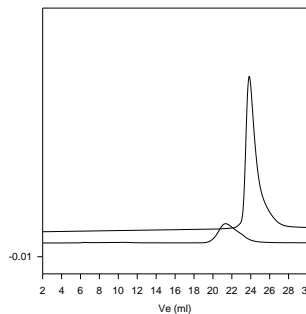
P6778-3HTMMA



Size exclusion chromatography of poly(3-hexylthiophene-b-styrene):

— Allyl terminated poly(3-hexylthiophene), $M_n=15,000$, $M_w=17200$, $M_w/M_n=1.15$
— Block Copolymer $M_n=P3HT(15000)$ -b-PS(85,000), $M_w/M_n=1.9$

P6778-3HTMMA UV response (380nm)



Size exclusion chromatography of poly(3-hexylthiophene-b-styrene):

— Allyl terminated poly(3-hexylthiophene), $M_n=15,000$, $M_w=17200$, $M_w/M_n=1.15$
— Block Copolymer $M_n=P3HT(15,000)$ -b-PS(85,000), $M_w/M_n=1.9$