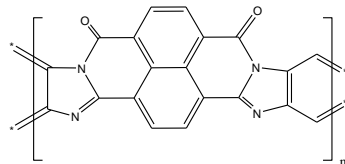


Sample Name:
Poly(benzimidazobenzophenanthroline)

Sample #: **P42283B-BBL**

Structure:



Composition:

Intrinsic Viscosity In CH ₃ SO ₃ H
0.5 dl/g

Synthesis Procedure:

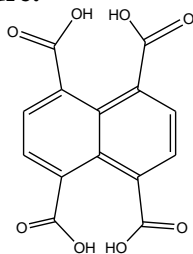
Procedure used as reported in literature: F.E Arnold and R. L VanDeusen, Macromolecules, 2, 497, 1969

Monomers used in the synthesis of Poly(benzimidazobenzophenanthroline):

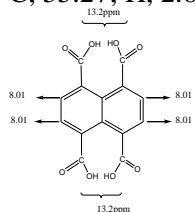
Sample Name:
1,4,5,8-NAPHTHALENETETRACARBOXYLIC ACID

Sample #: Naphth-4COOH Lot# P18857-Naph4COOH

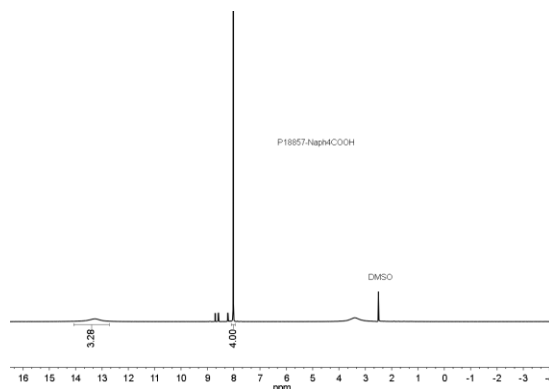
Structure:



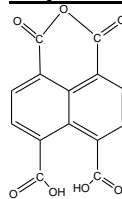
Composition: purity > 90% (from NMR)
 Impurities: Naphthalene or naphthalene anhydride
 Formula: C₁₄H₈O₈
 Mol. Wt.: 304.2
 C, 55.27; H, 2.65; O, 42.07



H NMR of 1,4,5,8-NAPHTHALENETETRA CARBOXYLIC ACID in DMSO:

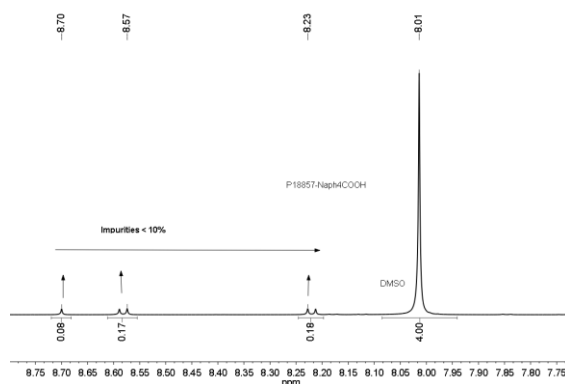


Impurities:



And Naphthalene

H NMR of 1,4,5,8-NAPHTHALENETETRA CARBOXYLIC ACID in DMSO:

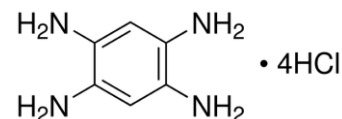


Sample Name:

1,2,4,5-Tetraaminobenzene tetrahydrochloride

Sample #: BZ4NH₂ Lot# P18892-Bz4NH₂.HCl

Structure:

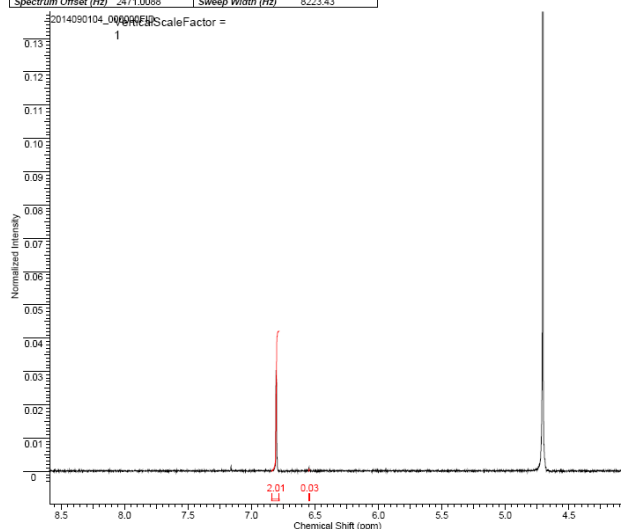


CAS: 4506-66-5

Color: White color

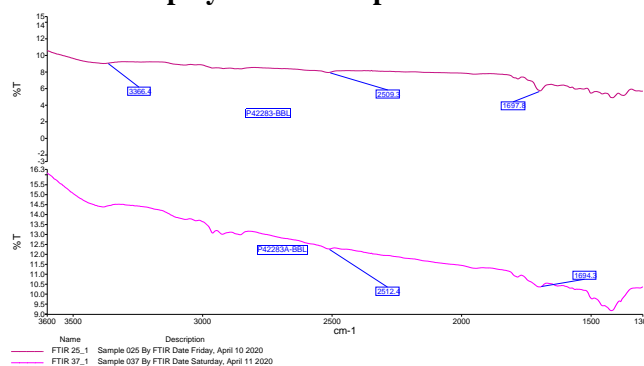
Solubility in water: 25mg/ml

Acquisition Time (sec)	3.9846	Comment	20140901.4	Date	01 Sep 2014 12:48:00
Date Stamp	01 Sep 2014 12:48:00				
File Name	C:\DOCUMENTS AND SETTINGS\ADMINISTRATOR\1\2014090104\2014090104_0000000.FID				
Frequency (MHz)	400.13	Nucleus	¹ H	Number of Transients	12
Origin	spec	Original Points Count	32768	Owner	nmr
Points Count	32768	Pulse Sequence	zgpg30	Receiver Gain	203.00
SW (cycles)	8223.68	Solvent	DEUTERIUM OXIDE		
Spectrum Offset (Hz)	2471.0088	Sweep Width (Hz)	8223.43		



No.	(ppm)	Value	Absolute Value	Non-Negative Value
16	6.841	0.03353167	1.64225680e+7	0.03353167
26	6.842	0.00714044	9.83022784e+8	2.00714040

FTIR of the polymer in KBr pellet:



FTIR of the product is similar as reported in the literature: F.E Arnold and R. L VanDeusen, Macromolecules, 2, 497, 1969
For high molecular weight polymer.

Characterization:

The product was characterized by:

1. Intrinsic viscosity in CH₃SO₃H
2. Elemental analysis
3. FTIR on KBr powder

Solubility:

1mg / 1ml methane sulfonic acid clear pink color solution.

Solution Viscosity of the polymer in CH₃SO₃H:

Intrinsic viscosity measurement (dl/g) of P42283 in concentrated sulfuric acid at 25 °C
0.5 dl/g

Elemental Analysis:

Theoretical Values: C₂₀H₆N₄O₂

C	H	N	O
68.2	2.27	15.9	13.6

Values found: C₂₀H₆N₄O₂

C	H	N	O
59.35 %	2.15 %	11.54 %	To Follow.
S			
1.15 %			