

April 25, 2016

William D. Marsillo Boies, Schiller &Flexner LLP 333 Main Street Armonk, NY 10504

Dear Mr. Marsillo:

Boies, Schiller & Flexner retained me to assist with its representation of Boston Scientific Corporation ("Boston Scientific") concerning topics related to the litigation captioned as *Stevens v. Boston Scientific Corp.*, et al. (C.A. 2:16-cv-0265). Specifically, I was asked to analyze the chemical properties of polymer resin and product samples. This letter summarizes the samples I have analyzed, the methods by which the samples were analyzed, the analytical data sets obtained, and my conclusions based on the data sets.

#### I. Summary

Polymer Solutions received nine samples for testing: five (5) resin samples and four (4) product samples. We used a number of analytical methods to evaluate the chemical properties of the samples, including Fourier transform infrared spectroscopy (FTIR); induced coupled plasma with optical emission spectroscopy (ICP-OES); melt flow index testing; differential scanning calorimetry (DSC); extraction testing; gas chromatography mass spectroscopy (GCMS); high performance liquid chromatography (HPLC); high temperature gel permeation chromatography (GPC); and size exclusion chromatography. The results of our evaluation can be summarized as follows:

- The resin samples are fiber-forming polypropylene homopolymer. The product samples are made from fiber-forming polypropylene homopolymer.
- The resin samples do not have detectable levels of selenium or titanium. Only trace levels of three metals (zinc, aluminum, and magnesium) were found in resin samples and the levels of these trace metals would be expected to be present in polypropylene homopolymer resin.
- > There was no evidence of any unexpected chemical compound in any of the resin or product samples. All chemical compounds that were detected comprised constituents of an expected type and quantity, such as antioxidants.
- > The resin samples have substantially equivalent melt flow index values.
- > The resin samples and product samples have substantially equivalent thermal properties.
- All samples were substantially equivalent in that they all had low extractable content.
- > The resin samples and product samples have substantially equivalent molecular weights and polydispersity.

Relish the Challenge. Then Solve It.

Based on my analysis, the resin samples are substantially equivalent to each other and the product samples are substantially equivalent to each other. Moreover, based on my analysis, I would not expect there to be any material differences in the fiber-forming characteristics of the sampled resins or in the mechanical properties of textile products, manufactured in a similar manner, from the sampled resins.

#### II. Samples That Were Analyzed

Polymer Solutions received the following nine samples for testing:

RESIN SAMPLES	PRODUCT SAMPLES
Resin Sample A1	Product Sample E1
Resin Sample B1	Product Sample F1
Resin Sample C1	Product Sample G1
Resin Sample D1	Product Sample H1
Resin Sample 11	

The resin samples received were all in the form of translucent pellets. The product samples received were all in the form of mesh woven from fibers. It is my understanding that the resin samples are representative of the polymer from which the mesh-portion of the product samples was produced. I was not informed of any specific product sample having been manufactured from any specific resin sample; nor was I informed of any specific relationships among the various resin samples or among the various product samples until after I had completed my analysis. I also was not informed of the particular brand, grade, supplier, or manufacturer of the resin samples until after I had completed my analysis. My analysis of these nine samples is independent and unbiased. All of the analytical data sets, acquired by the aforementioned methods, are herein reported.

#### III. Analytical Methods Applied to the Nine Samples

The following analytical methods were used to evaluate the resin samples and product samples:

ANALYTICAL METHOD	RESIN SAMPLES	PRODUCT SAMPLES
Fourier transform infrared spectroscopy	$\square$	$\square$
Induced coupled plasma with optical emission spectroscopy	· 🗹	
Melt flow index testing	· 🗹	
Differential scanning calorimetry	$\square$	$\square$
Extraction testing	$\square$	
Gas chromatography mass spectroscopy		$\overline{\checkmark}$
High performance liquid chromatography		$\square$
High temperature gel permeation chromatography		
Size exclusion chromatography	$\square$	$\overline{\square}$

All comparisons were made to resin sample A1. That is, the measured properties of resin samples B1, C1, D1, and I1 were compared to resin sample A1. Product samples E1, F1, G1, and H1 also were compared with resin sample A1. If desired, comparisons between other samples can also be made.



## IV. Classification of the Resin Samples

Based on the Fourier transform infrared spectroscopy data sets I have determined that the resin samples are all polypropylene homopolymer. The resin samples are not copolymers nor are they comprised of a polymer other than polypropylene. The melt flow index (MFI) values among the five resin samples are the same;  $3.5\pm0.2$  g/10 min. It is my understanding that the sampled resins were used to manufacture the mesh-portion of the product samples. I have examined the product samples and have verified that the product samples are comprised of fibers. Thus, the resin samples are properly described as fiber-forming polypropylene homopolymer having an MFI value of 3.5. Based on this analysis, resin samples A1, B1, C1, D1, and I1 are the same.

# V. Detailed Analysis of the Resin Samples and Product Samples

## A. FTIR ATR Mode of Analysis of Resin Samples and Product Samples

Fourier transform infrared spectroscopy is a well-established accurate and accepted method of analysis to determine or verify the composition of a polymer. Resin samples were analyzed by directly contacting the exterior surface of individual pellets with the attenuated total reflection ("ATR") crystal used in the FTIR device ("Outside") and by cutting pellets and contacting a freshly created interior surface ("Inside"). The infrared spectra for the inside and outside surfaces of each Product Sample were also obtained. After each infrared spectrum was acquired by directly contacting a surface of each sample, the ATR crystal was removed from the sample and another infrared spectrum of the crystal was acquired ("Transfer"). If any low molecular weight materials had been present on the exterior surface of a sample, those materials could transfer to the ATR crystal and yield an interpretable infrared spectrum. There were no low molecular weight materials on the exterior surface of any of the samples. An example infrared spectrum is shown below.

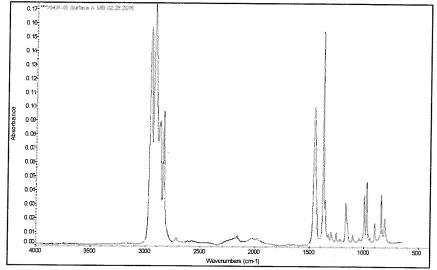


Figure 1. FTIR-ATR mode infrared spectrum of the outside surface of Resin Sample A1.

 $<sup>^1</sup>$ FTIR spectra for all other resin and product samples are annexed to this report as Attachment A.

The infrared spectra that were acquired for the resin samples and product samples were put into a database of spectra. The infrared spectrum for resin sample A1 was searched against the entries in the database. The search algorithm returns a "Match Factor" number on a scale of 0 to 100%.

Observations: The match factor was at or above 95% for the comparison of each individual spectrum with the spectrum recorded for resin sample A1 (See Table 1). This match factor value indicates that each resin sample and each product sample is substantially equivalent to resin sample A1. The spectra were also searched against our library of infrared spectra. The top match of all of the spectra acquired for the samples was with polypropylene. Furthermore, polypropylene is expected to display four defined peaks between wavelengths of 2700 cm<sup>-1</sup> and 3000 cm<sup>-1</sup>, and two defined peaks at approximately 1400 cm<sup>-1</sup>. As can be seen in Figure 1, above, and in Attachment A, that is precisely what can be seen in the FTIR spectrum for every sample. A manual interpretation of each infrared spectrum further confirmed that the computer-generated spectral matches were correct. If any of the resin samples or product samples had not comprised polypropylene homopolymer, that would have been revealed by the Fourier transform infrared spectroscopy method.

	Insi	de	Out	tside	Average	
Client Identification	Run 1	Run 2	Run 1	Run 2	Inside	Outside
Resin Sample A1	100	99	98	100	99	99
Resin Sample B1	98	97	97	99	98	98
Resin Sample C1	99	100	98	100	99	99
Resin Sample D1	99	100	99	98	100	98
Resin Sample I1	95	100	99	98	97	99
Product Sample E1			99	96		97
Product Sample F1			98	98	78.75	98
Product Sample G1			98	96		97
Product Samples H1			99	98	artisin.	98

#### B. ICP-OES Analysis of Resin Samples

A sixty-five element scan was performed on each of the resin samples. For each sample a single solution was prepared from which triplicate data sets were acquired. If any of the sixty-five elements (Figure 2) are present in the samples at or above a concentration of 50-ppm (except for lithium and potassium, 500-ppm) and at a concentration that exceeds our analytical blank samples, their concentration was reported. This is the proper methodology for reporting the chemical elements that comprise a sample. The acids and reagents that are required to convert the sample to an analytical specimen, as well as the containers and implements that are used to contain and transfer the analytical specimen into the ICP instrument, can each contribute background concentrations of chemical elements that are not contributed by the analytical specimen. Proper analysis requires this correction to the data set.

	Ħ		_															He
K         Ca         Sc         Ti         V         Cr         Mn         Fe         Co         Ni         Cu         Zn         Ga         Ge         As         Se         Br           Rb         Sr         Y         Zr         Nb         Mo         Tc         Ru         Rh         Pd         Ag         Cd         In         Sn         Sb         Te         I           Cs         Ba         Hf         Ta         W         Re         Os         Ir         Pt         Au         Hg         Ti         Pb         Bi         Po         At           Fr         Ra         Rf         Db         Sg         Bh         Hs         Mt         Ds         Rg         Cn         Uut         Fl         Uup         Lv         Uus	Ц	Be											В	С	N	0	F	Ne
Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te i CS Ba Hf Ta W Re Cs Ir Pt Au Hg TI Pb Bi Po At Fr Ra Rf Db Sg Bh Hs Mt Ds Rg Cn Uut Fl Uup Ly Uus	Na	Mg											Ai	Si	Р	s	cı	Ar
Cs Ba Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Fr Ra Rf Db Sg Bh Hs Mt Ds Rg Cn Uut Fl Uup Lv Uus	к	Ca	Sc	Ti	v	Cr	Mn	Fe	Co	Nî	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Fr Ra Rf Db Sg Bh Hs Mt Ds Rg Cn Uut Fl Uup Lv Uus	Rb	Sr	у	Zr	Nb	Mo	Tc	Ru	Rh	Pđ	Ag	Cď	In	Sm	Sb	Te	1	Хе
	Cs	Ba		Hf	Ta	w	Řе	Os	lr .	Pt	Au	Hg	TI	Pb	Bi	Ро	At	Rn
La Ce Pr Nd Pm Sm Eu Gd Tb Dv Ho Er Tm Vb	Fr	Ra		Rf	DЬ	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Fl	Uup	Lv	Uus	Uuc
La Ce Pr Nd Pm Sm Eu Gd Tb Dv Ho Er Tm Yb																Lancapanin		
				La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Тъ	Dy	Но	Er	Tm	Υb	Lu
Ac Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No				Αc	Th	Pa	U	Νp	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	IJ
Included in standard semiquant method							includ	ed in	stand	ard se	migu	aryt m	ethod					
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Figure 2. The chemical elements that comprise the 65-element ICP-OES analysis of samples.

Within all the samples that were analyzed the total amount of chemical elements detected ranged from 50 to 380-ppm. This total amount of chemical elements is 0.0050 to 0.0380 weight percent, which is a trace level range of chemical elements. The table below shows the elements and their concentrations that were detected in the resin samples.

Table 2. Concentration (ppm) of chemical elements detected in Samples using ICP-OES.

Element	Resin A1	Resin B1	Resin C1	Resin C1 (duplicate)	Resin D1	Resin I1
Aluminum (Al)	Not Detected	Not Detected	50	50	50	60
Magnesium (Mg)	50	50	Not Detected	Not Detected	Not Detected	Not Detected
Zinc (Zn)	Not Detected	Not Detected	330	330	310	340

Observations: The resin samples all lacked detectable quantities of sixty-two of the sixty-five chemical elements that could be detected using this methodology. Neither selenium nor titanium was detected in any resin sample. Furthermore, these chemical elements were also not present in our analytical blank samples. Only trace levels of magnesium, aluminum, and zinc were detected in the resin samples as indicated in Table 2. None of the trace elements (whether standing alone or in combination) would be expected to alter the fiber-forming characteristics of the polypropylene or properties of mesh woven from such polypropylene fibers.

#### C. MFI Testing of Resin Samples

Melt flow index ("MFI") testing is a method that determines the rate of flow of molten polypropylene resin through a die having a specified orifice diameter in response to a specified extrusion force at a specified temperature. (See ASTM D1238, which is the method utilized here). The MFI is a method that allows resin samples to be compared with each other. Often, the MFI value is used as a specification criterion for thermoplastic resin, such as polypropylene. Each resin sample was evaluated twice and the results averaged. Resin sample C1 was arbitrarily selected as a resin for which four independent MFI measurements were obtained. The average MFI value for resin sample C1 was 3.5 g/10 min and the standard deviation is 0.2 g/10 min.

<u>Observations</u>: The measured MFI values indicate that the resin samples are the same as each other with respect to this physical property. The average MFI value that was determined for each resin sample is shown in the table below.

Table 3.	Melt flow in	ndex values	recorded t	for the	resin sample	s.
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Client ID	Replicate	g/10 min	Average
Basin Samula A4	Α	3,6	3.4
Resin Sample A1	В	3.3	3,4
Resin Sample B1	Α	3,6	3.6
	В	3.7	٥,٥
Resin Sample C1	Α	3.3	3.5
	В	3.6	ა,ნ
Resin Sample C1	Α	3.7	3.6
	В	3,5	٥,٥
Resin Sample D1	Α	3.0	3.3
	В	3.5	ა,ა
Booin Comple 14	Α	3.3	2 E
Resin Sample I1	В	3.6	3.5

## D. DSC analysis of Resin Samples and Product Samples

Differential scanning calorimetric analysis was performed on each of the resin samples and each of the product samples. The initial form of the material and its previous process history contribute to the DSC data set in a way that is not useful to use the data set from the first heating cycle for comparing samples to each other. It is standard practice to use the first heating cycle and first cooling cycle that occurs within the DSC instrument to "erase" the previous thermal and processing history to create a common thermal history baseline for all samples. Then, the second heating cycle is used to compare the inherent characteristics of polymer samples. This is the approach that was followed to assess the resin samples and the product samples. (See, e.g., ASTM D3418, which was the method followed here). For reference purposes, a sample DSC curve is shown in Figure 5. Other DSC curves are annexed to this report as Attachment B.

Two parameters were evaluated from the DSC curve for the evaluation of resin samples): (1) the extrapolated onset of melting (157.55 °C, Figure 5); and (2) the melting peak (165.25 °C, Figure 5). In the case of product samples, which are fibers, ASTM D7138 is the relevant guiding document and the



protocol that was followed here. The table below shows the values obtained during the second heating cycle for each sample.

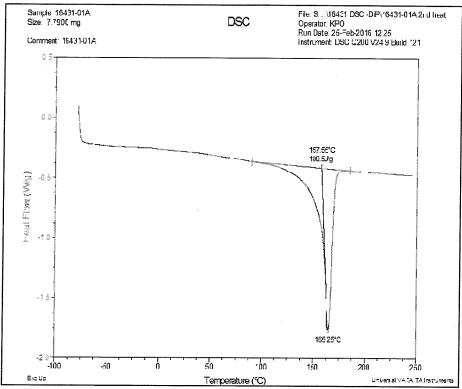


Figure 5. An example DSC curve for Resin Sample A1.

Table 4. The melting temperature values measured using the DSC method for samples during the second heating cycle.

Client Identification	Tm,°C	Melting Onset, °C
Pacin Cample A1	165	158
Resin Sample A1	166	156
Resin Sample B1	165	158
resili sample bi	165	157
Resin Sample C1	163	156
resiii Jaiiipie CI	163	156
Resin Sample D1	163	156
	163	156
Resin Sample I1	164	156
	163	156
Product Sample E1	164	154
Frounci Sample E1	162	155
Product Sample F1	163	155
rioduct sample F1	165	154
Product Sample C1	167	155
Product Sample G1	165	156
Draduct Cample U1	165	155
Product Sample H1	165	155

<u>Observations</u>: The DSC analysis of resin samples and product samples indicate that the melting temperature and onset of melting are the same for each of the samples. These values are within 3 °C or less for all of the resin samples and product samples tested. The resin and product samples thus have substantially equivalent thermal properties.

## E. Solvent Extraction Content of Resin Samples and Product Samples

Hexane, a powerful solvent for removing low molecular weight chemicals from polypropylene resins was used to determine the extraction content of the resin and product samples. The solvent extraction content indicates "how much" but does not indicate the specific chemicals that comprise the extracted material. The resin samples were ground at cryogenic temperatures to reduce the pellets to a fine powder prior to the extraction process. The product samples were cut into smaller pieces prior to the extraction process. The samples were extracted with hexane for two hours in accordance with 21 CFR 177.1520. The extraction content is determined on a weight percentage basis with respect to the initial mass of sample that was extracted. The results are shown in the table below.

Table 5. Extraction content of resin samples and product samples.

Client ID	% Extract
Resin Sample A1	1.26
Resin Sample B1	1.18
Resin Sample C1	2.02
Resin Sample C1	
(duplicate)	2.14
Resin Sample D1	2.06
Resin Sample I1	2.61
Product Sample E1	0.61
Product Sample F1	0.90
Product Sample G1	0.26
Product Sample H1	Not Measured

<u>Observations</u>: The resin samples are substantially equivalent to the extent that they all have low extractable content, 1.9±0.6 weight percent. Although some resins have extractable content in the range of 2%, and others have extractable content in the range of 1%, this difference is not expected to alter the fiber-forming characteristics or properties of the polypropylene.

## F. GC-MS analysis of Resin Samples and Product Samples

To augment the extraction content data, additional analysis was performed on the chemicals that were dissolved in the extraction solvent. Gas chromatography was used to separate the mixture of chemicals in the solvent into individual chemicals. The individual chemicals were then directed to a mass spectrometer for identification. Together, the separation (GC) and identification (MS) comprise the GC-MS method of analysis.

Tables of information that summarize the chemicals that were detected in the resin samples and product samples are provided below. It should be recognized that the product samples may contain specific chemicals imparted to the fibers comprising the product samples of types and concentrations specific to the fiber-manufacturing process that are not present in the resin samples.

Table 6. Chemicals that were detected in the resin samples.

	Samples							
	A1	B1	C1	C1	D1	l1		
Most Probable ID	16431-01	16431-02	16431-03a	16431-03b	16431-04	16431-09		
Phenol, 4-(2-propenyl)-, acetate	-	-	39	31	25	50		
Unspecified cyclic compound	369	388	-	-	-	-		
2,4-Di-tert-butylphenol	-		390	381	301	378		
Unspecified aromatic compound	-		57	57	56	97		
Pentylparaben	-	-	346	356	352	491		
Irgafos 168	<b>1,2</b> 32	1,273	103	100	68	92		
Oxidized Irgafos 168	84	171		-	-	_		
Total	1685	1832	935	925	802	1108		
Count	3	3	5	5	5	5		

Table 7. Chemicals that were detected in the product samples.

	Samples								
	E1 F1		G1	H1					
Most Probable ID	16431-05	16431-06	16431-07	16431-08					
Unidentified		<del>-</del>	53	-					
2,4-Di-tert-butylphenol	61	39		<u>-</u>					
Isopropyl laurate	277	140	-	• 35					
Unspecified octanoic acid ester	124	195	<u>-</u>						
Unspecified fatty acid ester	143	227	-	-					
Unidentified	136	225	-	-					
Unidentified	48	66	-	-					
Unidentified	184	261	<u>-</u> 193	_					
Unidentified	177	256	•	31					
Unidentified	190	256	+	•					
Flexol 4GO	188	261	-	39					
Unidentified	233	241	<b>₽</b>	•					
Flexol 4GO	153	197	-	•					
Unidentified	161	252	-	• 9000					
Irgafos 168		-	77	•					
Unidentified	162	184		-					
Unidentified	•	<b>16</b>	85	-					
Unidentified	-	156	•						
Flexol 4GO	129	99		•					
Total	2364	3054	216	70					
Count	15	16	3	2					

<u>Observations</u>: The total amount of extractable materials in the resin samples (Table 6) detected by the GC-MS method is very low, less than 0.2 percent. Any differences in the amount of trace chemicals that were detected among the resin samples are not expected to alter the fiber-forming characteristics or mechanical properties of the polypropylene. The resin samples are thus substantially equivalent to each other.

Similarly, the product samples also are substantially equivalent to each other in that in all of the product samples (Table 7), the total amount of extractable materials detected by the GC-MS method is very low, less than 0.3 percent.

## G. HPLC Analysis of Resin Samples and Product Samples

High performance liquid chromatography was performed on resin samples and product samples to determine the concentrations of low molecular weight constituents that are soluble but are not volatile enough to be detected by the GC-MS method.

Table 8. Chemicals that were detected in the resin samples.

Identification	Antioxidant Concentration in Sample (ppm)						
	A1	B1	C1, Prep. 1	C1, Prep. 2	D1	11	
2,4-Di-tert-butylphenol	ND	ND	173	173	154	157	
Irganox 3114	685	684	ND	ND	ND	ND	
Irganox 1330	ND	ND	487	488	453	445	
Irgafos 168 (oxidized)	95	84	9	9	7	10	
Irgafos 168 (non-oxidized)	663	676	54	54	54	51	

ND = Not Detected

Table 9. Chemicals that were detected in the product samples.

Identification	Antioxidant Concentration in Sample (ppm)					
identification	E1	F1	G1	H1		
2,4-Di-tert-butylphenol	39	37	ND	ND		
Irganox 3114	ND	ND	106	ND		
Irganox 1330	92	133	ND	55		
Irgafos 168 (oxidized)	7	12	80	7		
Irgafos 168 (non-oxidized)	11	18	86	15		

ND = Not Detected

<u>Observations</u>: Though there are differences in the quantities and types of extractable chemicals detected in the resin and product samples (Tables 8 and 9), the differences in the trace chemicals that were detected are not expected to alter the fiber-forming characteristics or mechanical properties of the polypropylene.



## H. SEC Analysis of Resin Samples and Product Samples

Size exclusion chromatography was performed on resin samples and product samples to determine the concentrations of polymeric antioxidants ("PAO") and oligomeric hindered amine light stabilizers ("HALS") that these materials contain. For all nine samples analyzed, no PAO and no HALS were detected. Therefore, for the SEC analysis there is no table of data.

## I. GPC Analysis of Resin Samples and Product Samples

Gel permeation chromatography was performed on the resin samples and product samples in duplicate. The GPC method of analysis determines the molecular weight distribution of the polypropylene and reports the distribution as a series of "average values." The  $M_n$  average is the average molecular weight wherein each molecule, regardless of its size, contributes to the average simply based on its size. The  $M_w$  and  $M_z$  averages calculate the average molecular weight by giving increasingly greater value to the higher molecular weight portion of the molecular distribution. This is done because some properties are controlled by the  $M_n$  average molecular weight whereas other properties (viscosity, melt strength) are controlled by  $M_w$  and  $M_z$ . Further, the breadth of the molecular weight distribution,  $M_w/M_n$ , also called "polydispersity index," influences impact resistance and fiberforming characteristics, for example. The values obtained for the resin samples and product samples are shown in the table below.

Table 10. Molecular weight averages determined using high temperature GPC.

Client Identification	Mn	Mw	Mz	Mw/Mn
Resin Sample A1	57,794	528,841	1,633,500	9.16
Resin Sample B1	64,001	492,596	1,375,500	7.71
Resin Sample C1	41,769	513,076	1,641,500	12.29
Resin Sample C1 (Duplicate)	42,963	490,312	1,519,000	11.42
Resin Sample C1 (Triplicate)	56,062	479,440	1,385,500	8,55
Resin Sample D1	43,104	488,197	1,620,500	11.33
Resin Sample I1	55,351	480,892	1,405,000	8.69
Product Sample E1	45,830	486,389	1,490,500	10.63
Product Sample F1	43,978	488,182	1,504,000	11.10
Product Sample G1	61,936	473,836	1,399,000	7.65
Product Sample H1	45,363	491,625	1,527,000	10.84
Resin C Average	46,931	494,276	1,515,333	10.75
Resin C Standard Deviation	7,930	17,165	128,039	1.95

Observations: Resin sample C1 was arbitrarily selected as a sample for which three independent sets of pairs of measurements (6 measurements) were performed. The GPC tests for all samples were performed by Jordi Labs in Mansfield, Massachusetts. Jordi Labs did not receive any samples with the "A1" through "I1" designation. Rather, the subsamples were sent to Jordi Labs with a designation of xxx-yy-zz (Lab Notebook Number, Page Number, Subsample Number). Jordi Labs was not told that one of the samples it received was a triplicate of resin sample C1. This fact was concealed from them by using three different subsample designations for each of the three resin sample C1 subsamples that



were submitted. Furthermore, the analysis of resin sample C1 indicates the range of molecular weight values and polydispersity that are characteristic of the resin sample. The Average and Standard Deviation values for resin C show that the molecular weight values and the polydispersity are the same among the resin and product samples. The molecular weights and polydispersity values shown in Table 10 for the resin samples all indicate that the polypropylene samples have similar fiber-forming characteristics and properties.

## VI. Conclusion

Polymer Solutions performed appropriate, extensive, and sensitive analytical tests to determine the chemical properties of the resin samples and product samples you provided. The resin samples and product samples are nearly identical to each other. These samples are so similar that based on my education, experience, and training, to a reasonable degree of scientific certainty (i) the resin samples comprise fiber-forming polypropylene homopolymer resin, (ii) the product samples were manufactured using fibers that were produced using the resin samples, and (iii) I would not expect there to be any material differences in the fiber-forming characteristics of the sampled resins or in the mechanical properties of textile products, manufactured in a similar manner, from the sampled resins.

#### VII. Addendum

After the tests described in this report were performed, you informed me that:

- (i) the polypropylene is Marlex HGX-030-01;
- (ii) Resin Samples A1 and B1 were legacy sourced resin;
- (iii) Resin Samples C1, D1, and I1 were newly sourced resin;
- (iv) Product Sample G1 was made from legacy sourced resin; and
- (v) Product Samples E1, F1, and H1 were made from newly sourced resin.

As a result of this post-analysis information, I reconsidered the data sets that were acquired. My conclusions remain the same.

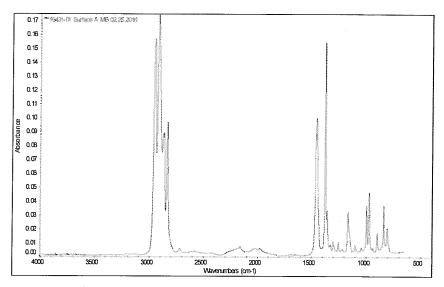
Sincerely,

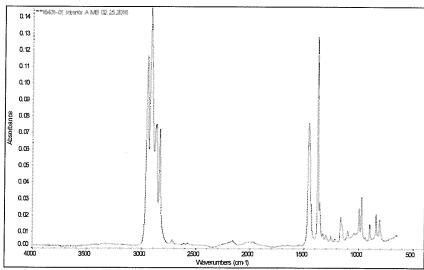
James Rancourt, Ph.D.

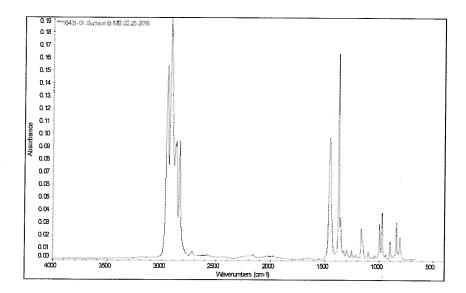
Founder, Chief Scientific Officer

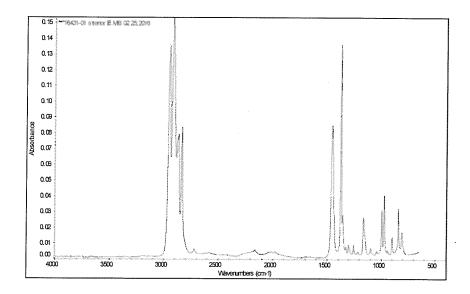
# **Attachment A**

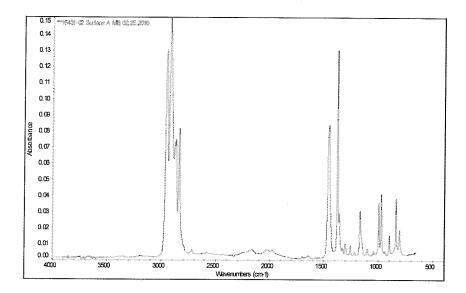
Fourier Transform Infrared Spectroscopy

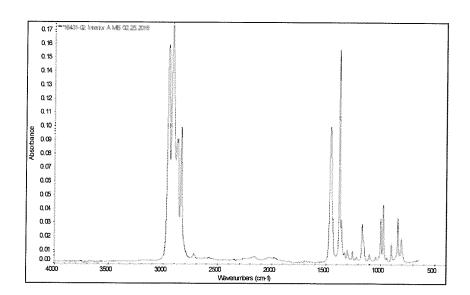


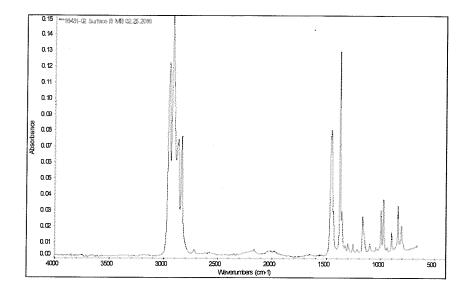


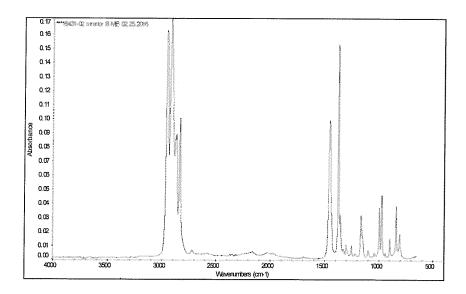


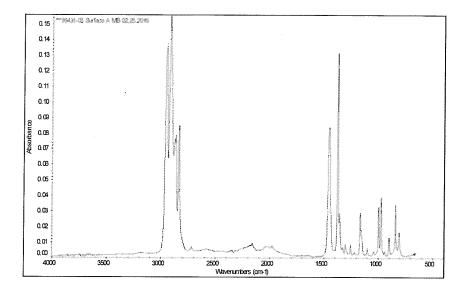


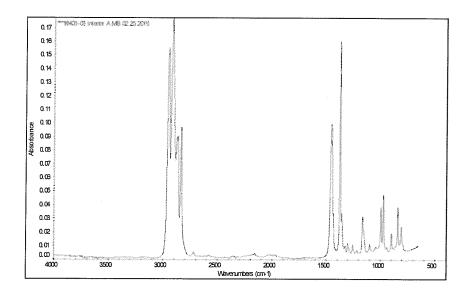


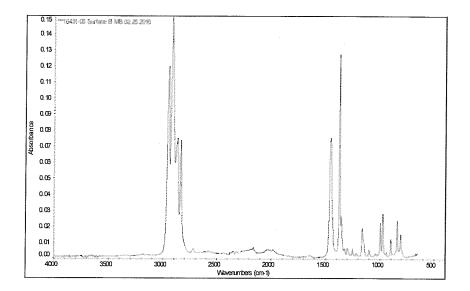


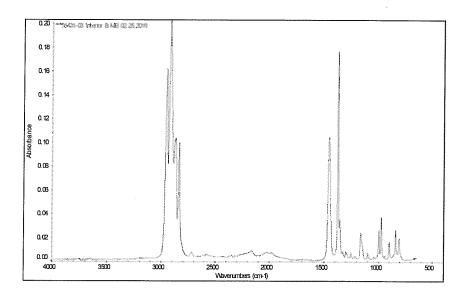


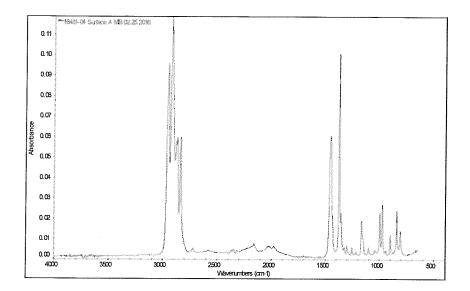


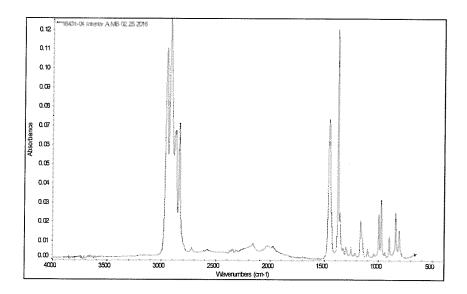


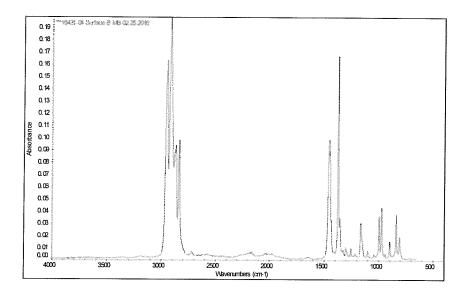


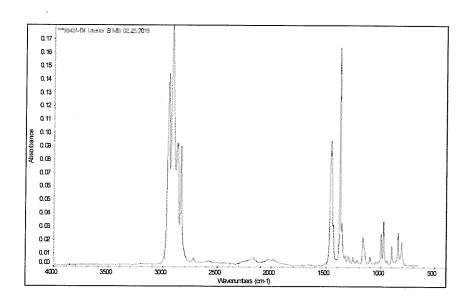


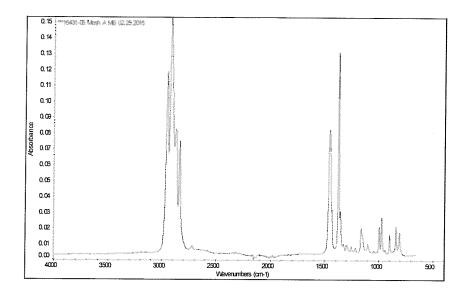


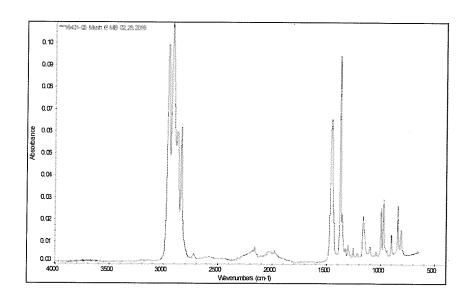


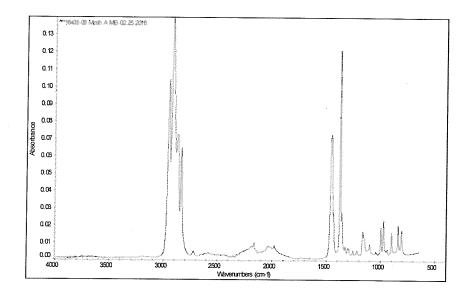


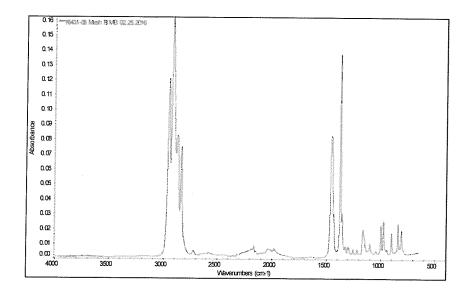


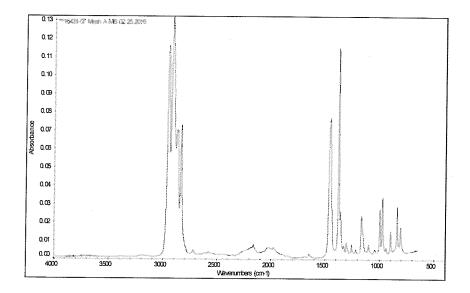


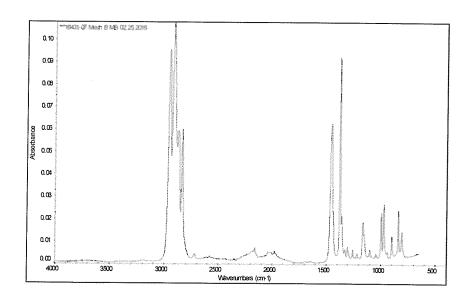


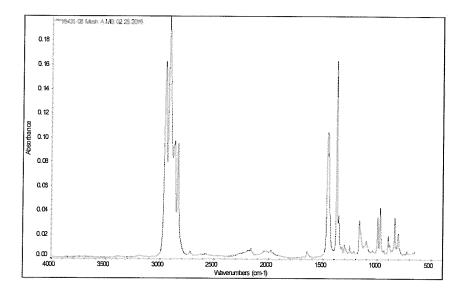


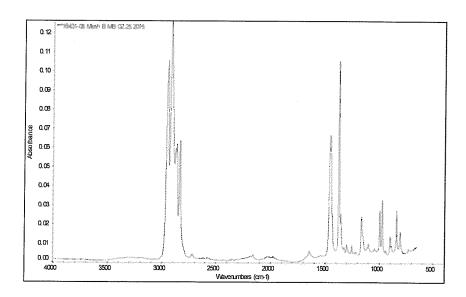


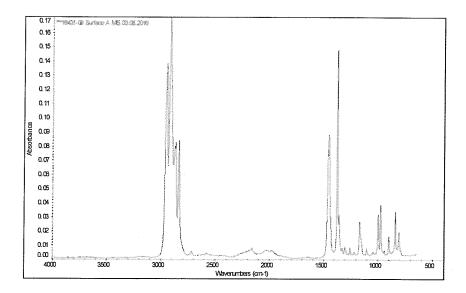


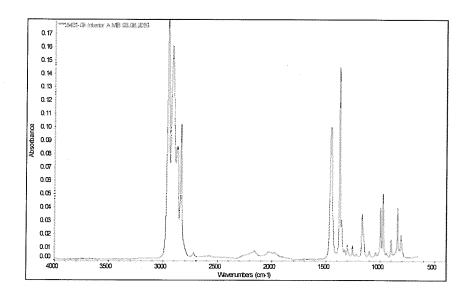


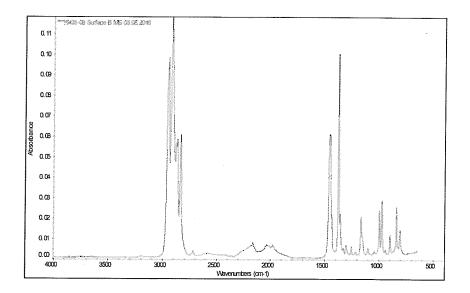


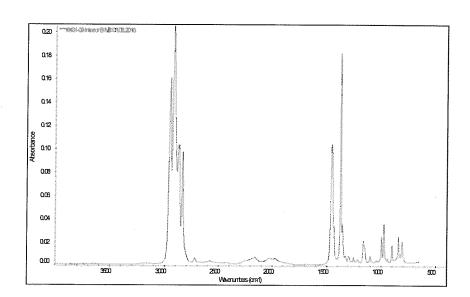






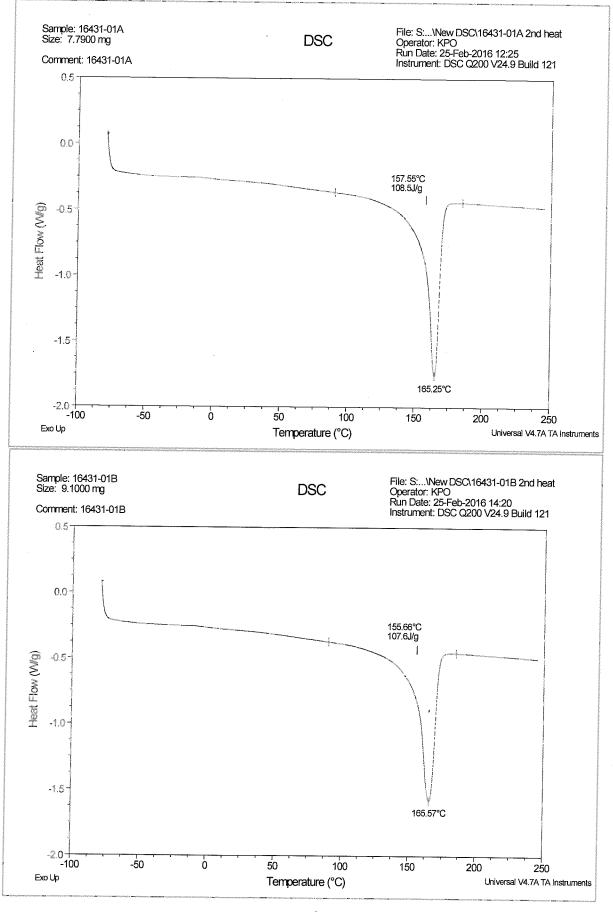




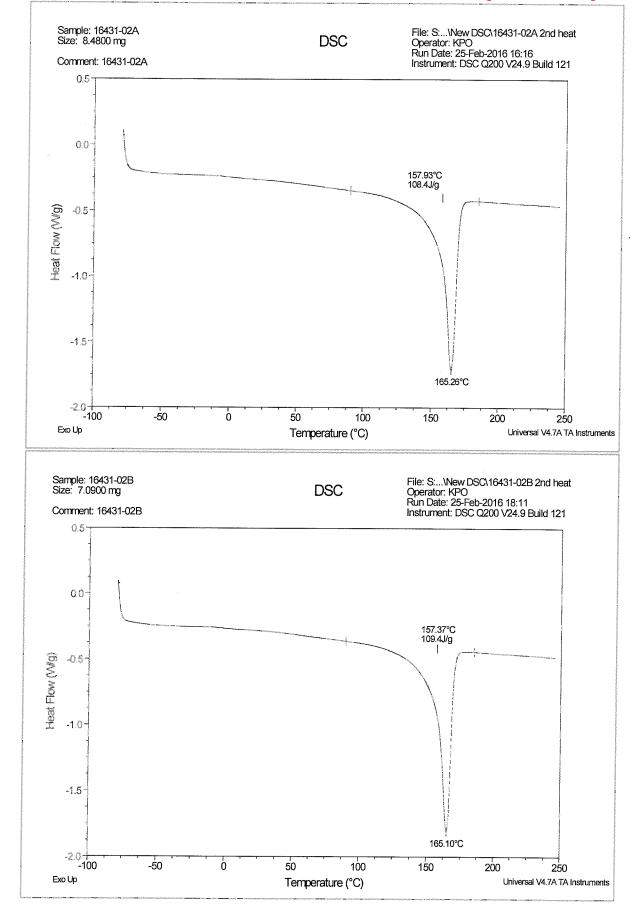


# **Attachment B**

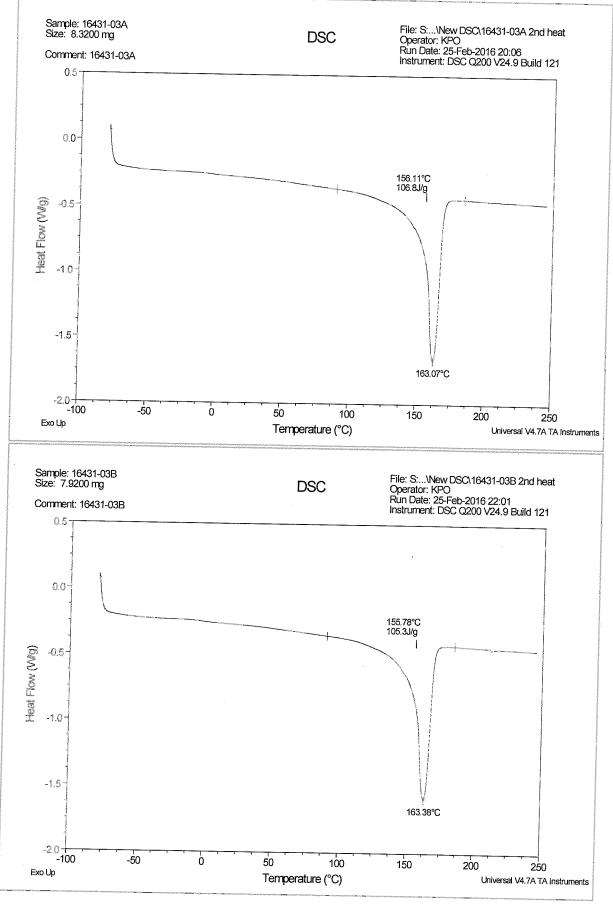
**Differential Scanning Calorimetry** 



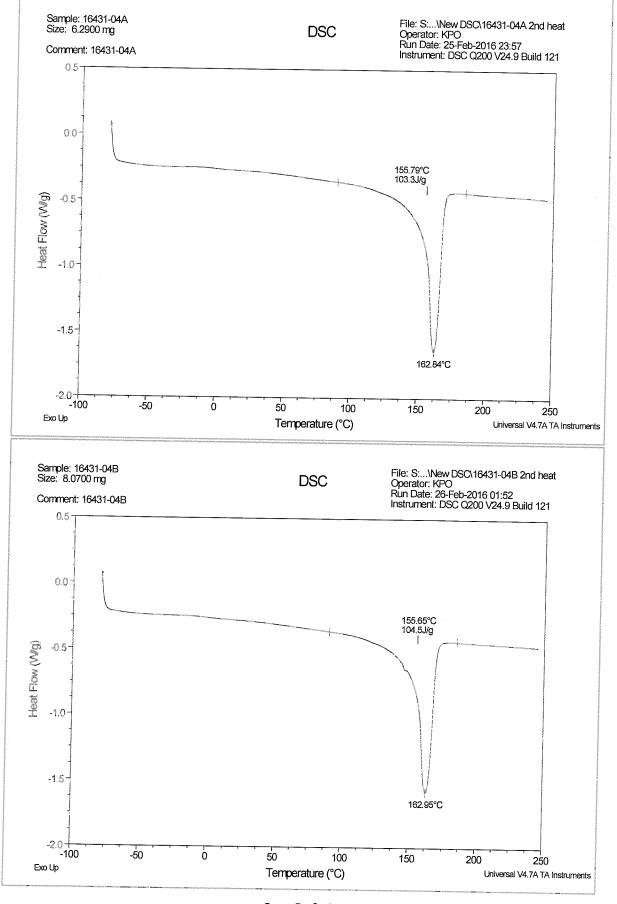
Page 2 of 10



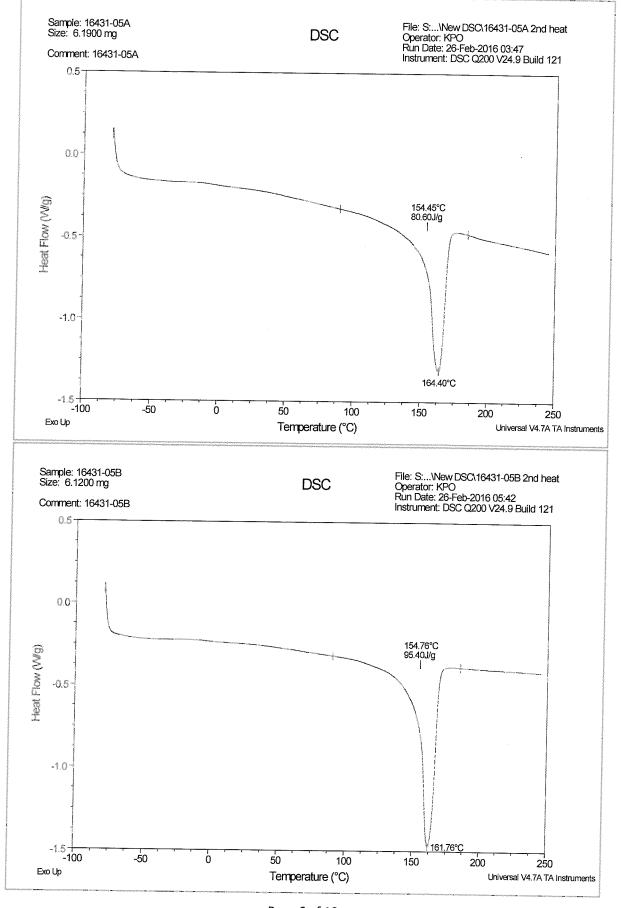
Page 3 of 10



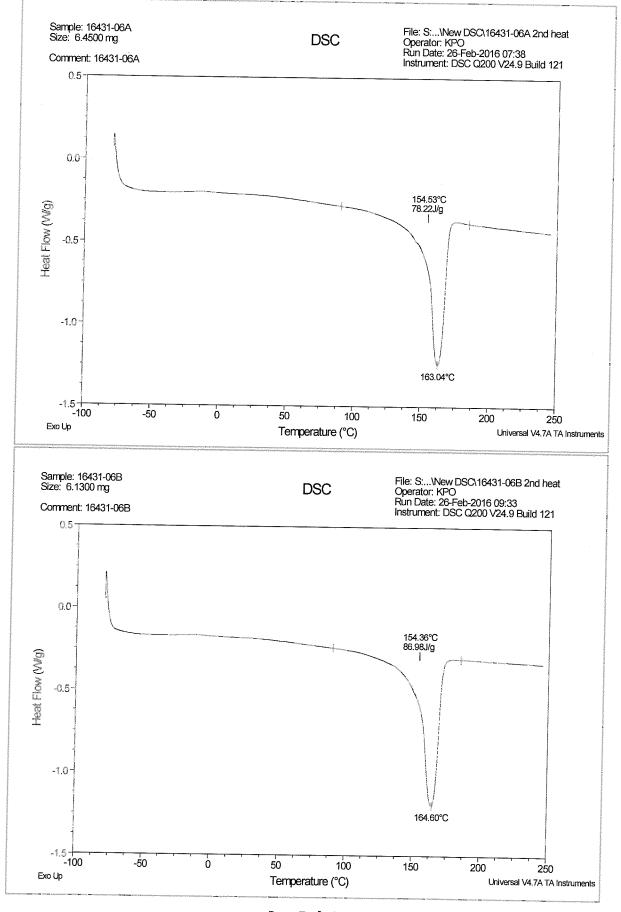
Page 4 of 10



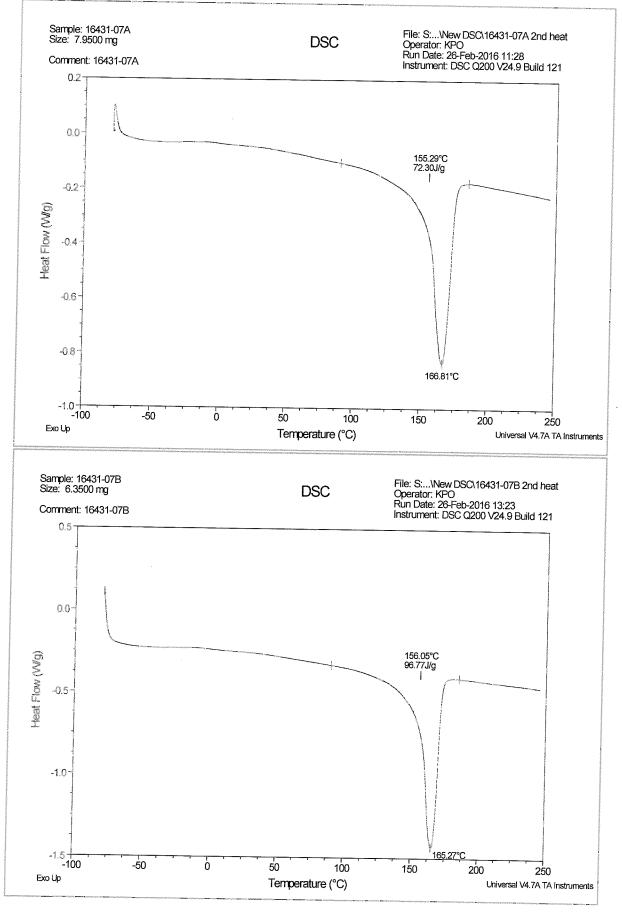
Page 5 of 10



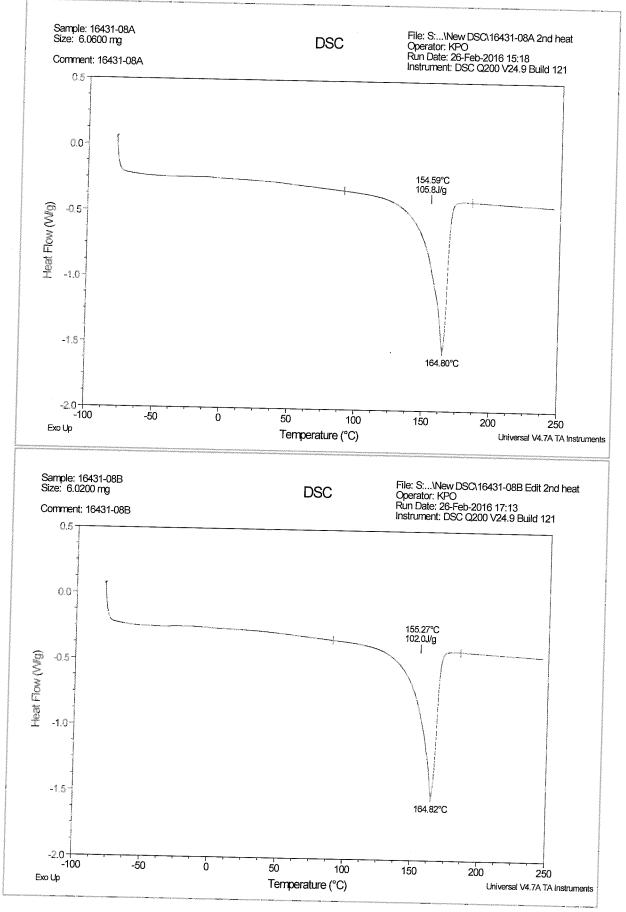
Page 6 of 10



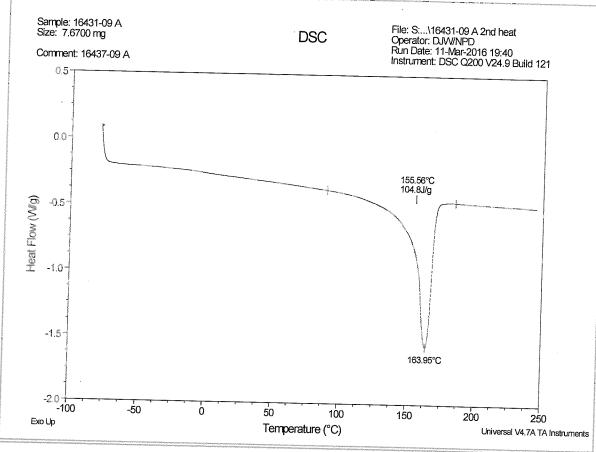
Page 7 of 10

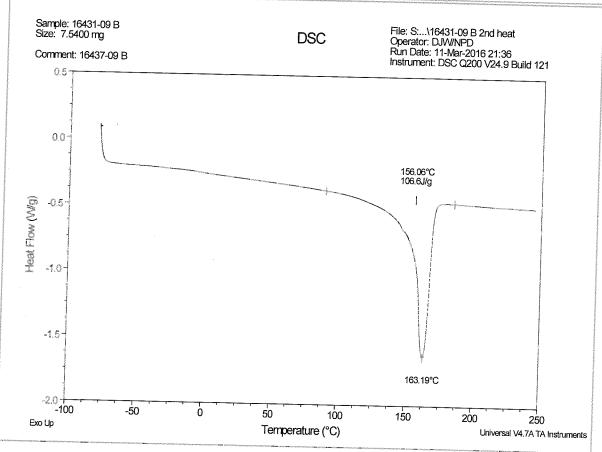


Page 8 of 10



Page 9 of 10





Page 10 of 10