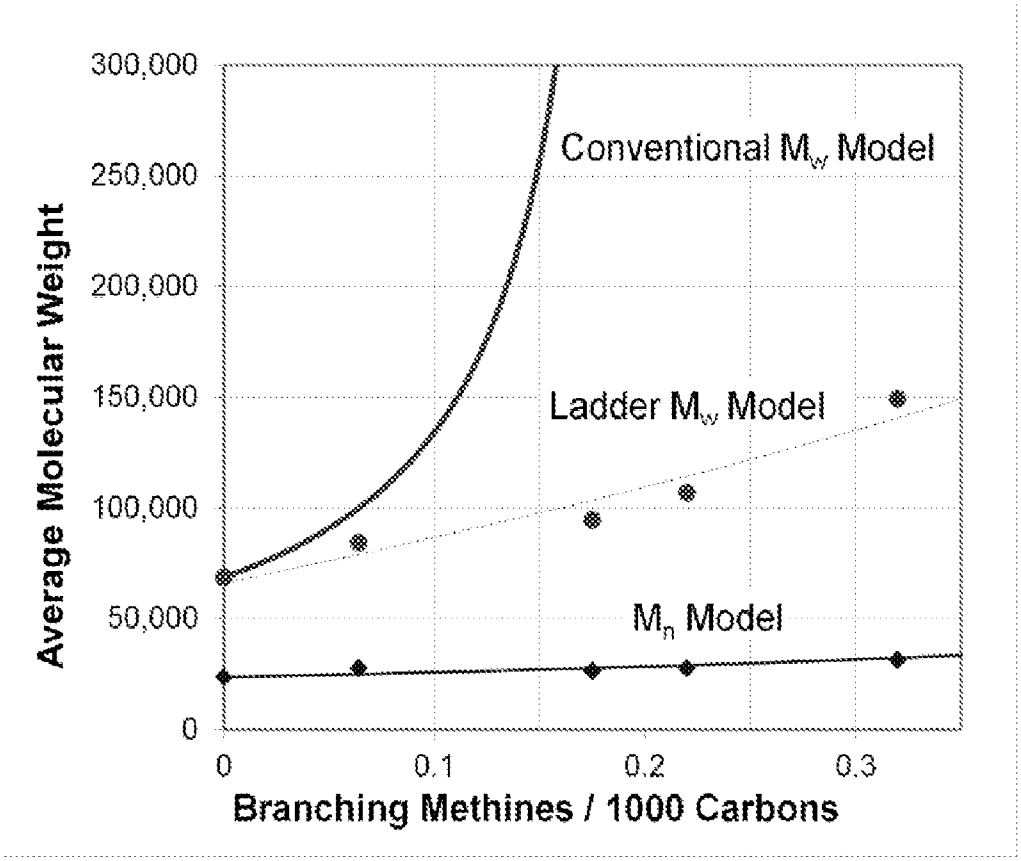

300,000
250,000
200,000
150,000
100,000
50,000
0
Average Molecular Weight
Conventional M_w Model
Ladder M_w Model
M_n Model
0
0.1
0.2
0.3
Branching Methines / 1000 Carbons

FIG. 1

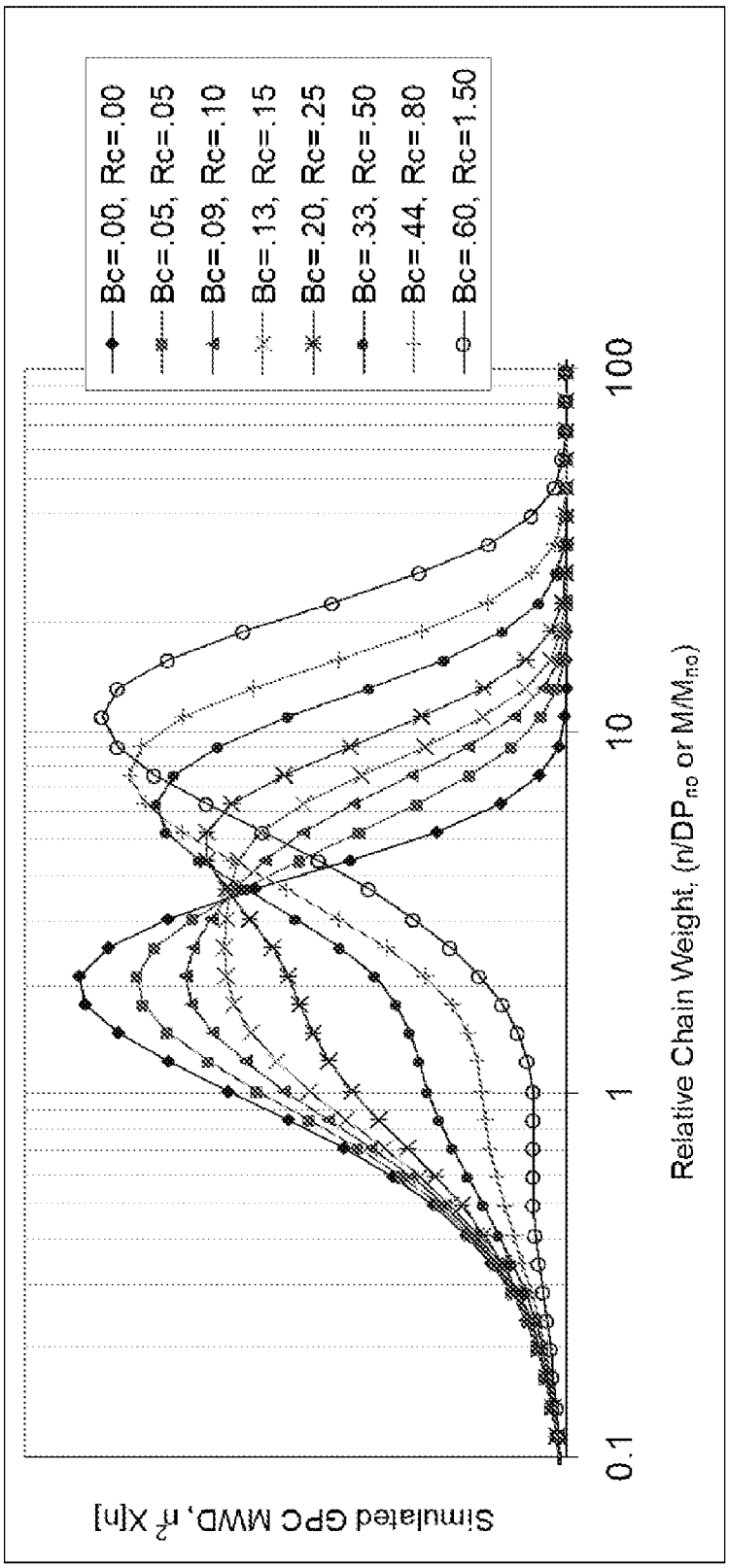

Bc=.00, Rc=.00
Bc=.05, Rc=.05
Bc=.09, Rc=.10
Bc=.13, Rc=.15
Bc=.20, Rc=.25
Bc=.33, Rc=.50
Bc=.44, Rc=.80
Bc=.60, Rc=1.50
0.1
1
10
100
Relative Chain Weight, (n/DPno or M/Mno)
Simulated GPC MWD, n² X[n]

FIG. 2

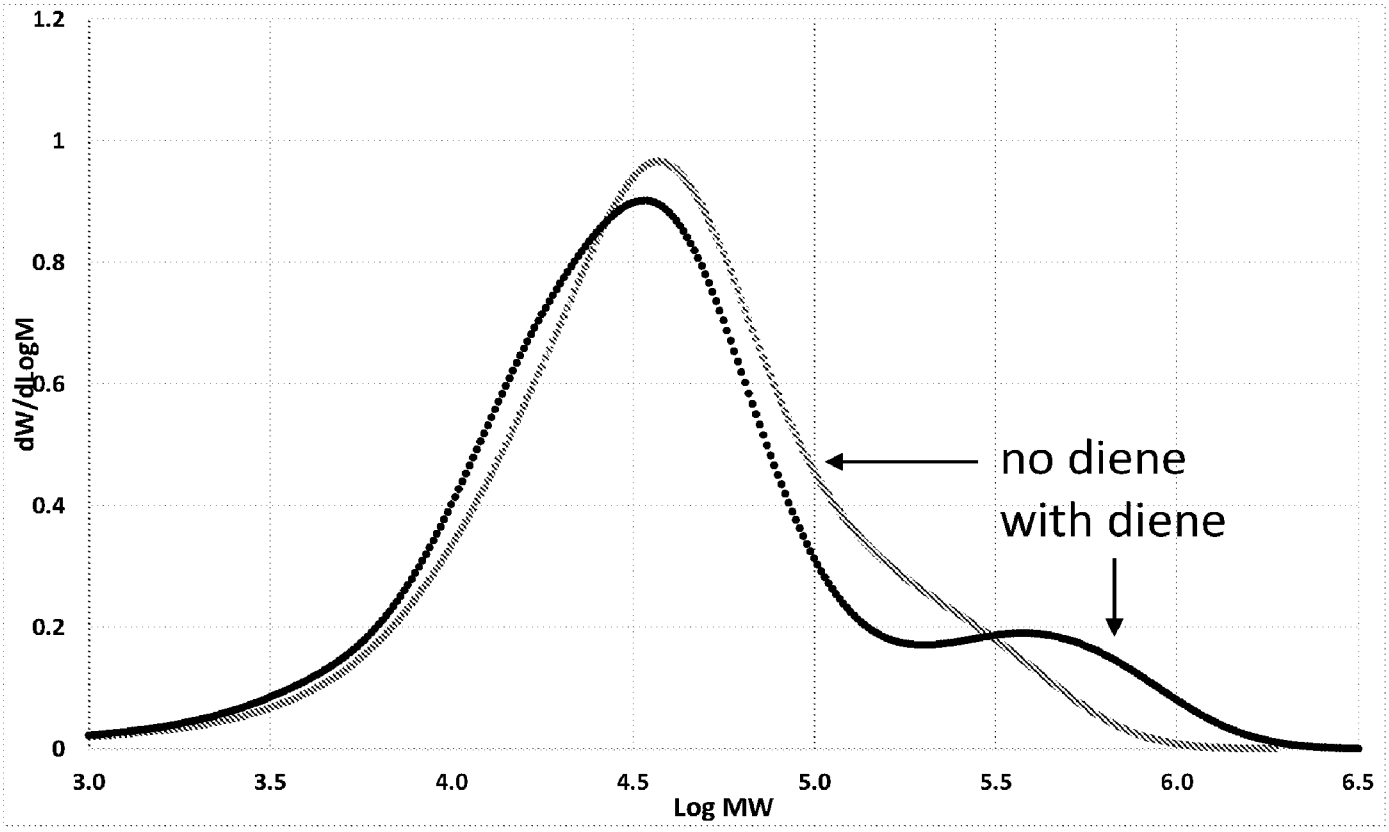

1.2
1
0.8
0.6
0.4
0.2
0
dW/dLogM
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
Log MW
no diene
with diene

FIG. 3

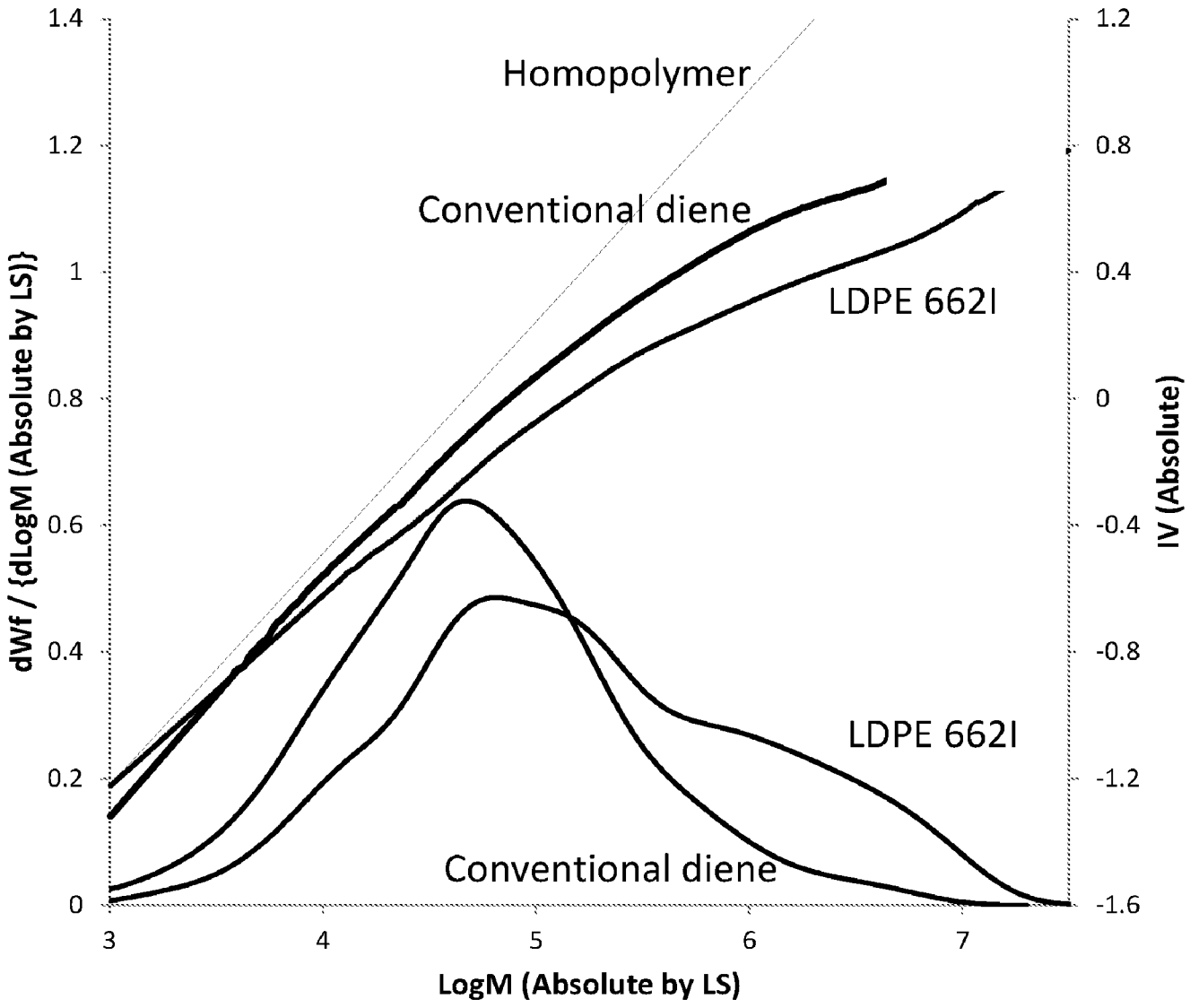
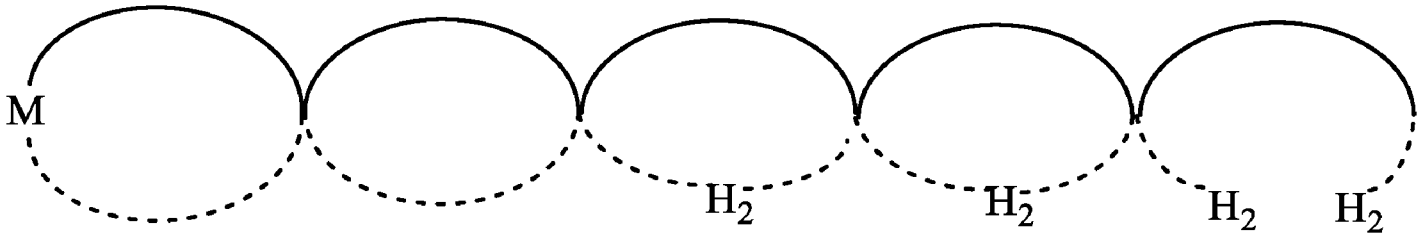

Homopolymer
Conventional diene
LDPE 662I
LDPE 662I
Conventional diene
dWf / {dLogM (Absolute by LS)}
IV (Absolute)
LogM (Absolute by LS)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1.2
0.8
0.4
0
-0.4
-0.8
-1.2
-1.6
3
4
5
6
7

FIG. 4



—— backbone MW

——+ ----- absolute MW

H2: hydrogenolysis

M: Metal

FIG. 5

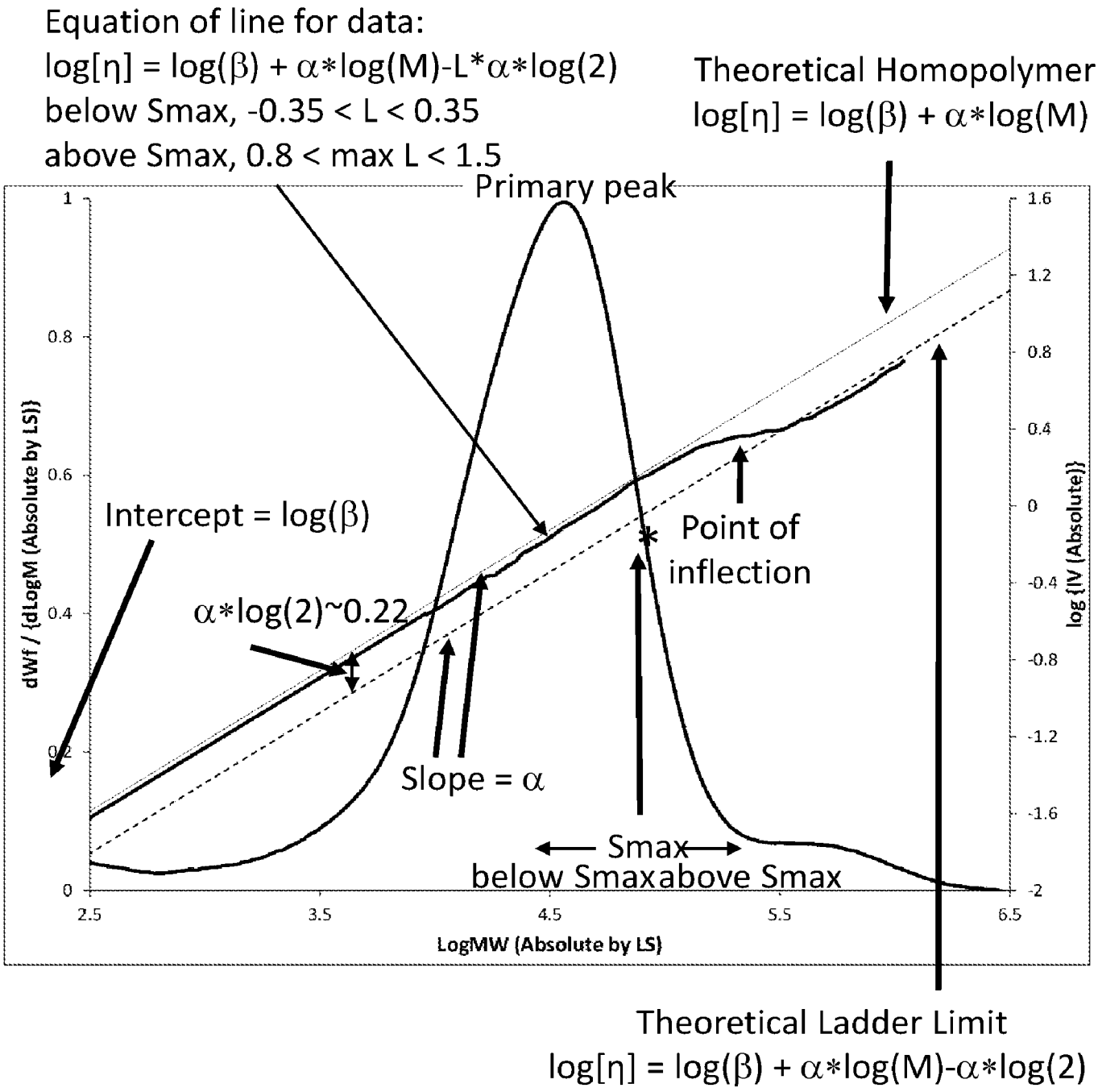

Equation of line for data:
log[η] = log(β) + α∗log(M)-L*α∗log(2)
below Smax, -0.35 < L < 0.35
above Smax, 0.8 < max L < 1.5
Theoretical Homopolymer
log[η] = log(β) + α∗log(M)
Primary peak
Intercept = log(β)
α∗log(2)~0.22
Slope = α
Point of inflection
Smax
below Smax
above Smax
dWf / {dLogM (Absolute by LS)}
log {IV (Absolute)}
LogMW (Absolute by LS)
Theoretical Ladder Limit
log[η] = log(β) + α∗log(M)-α∗log(2)

FIG. 6

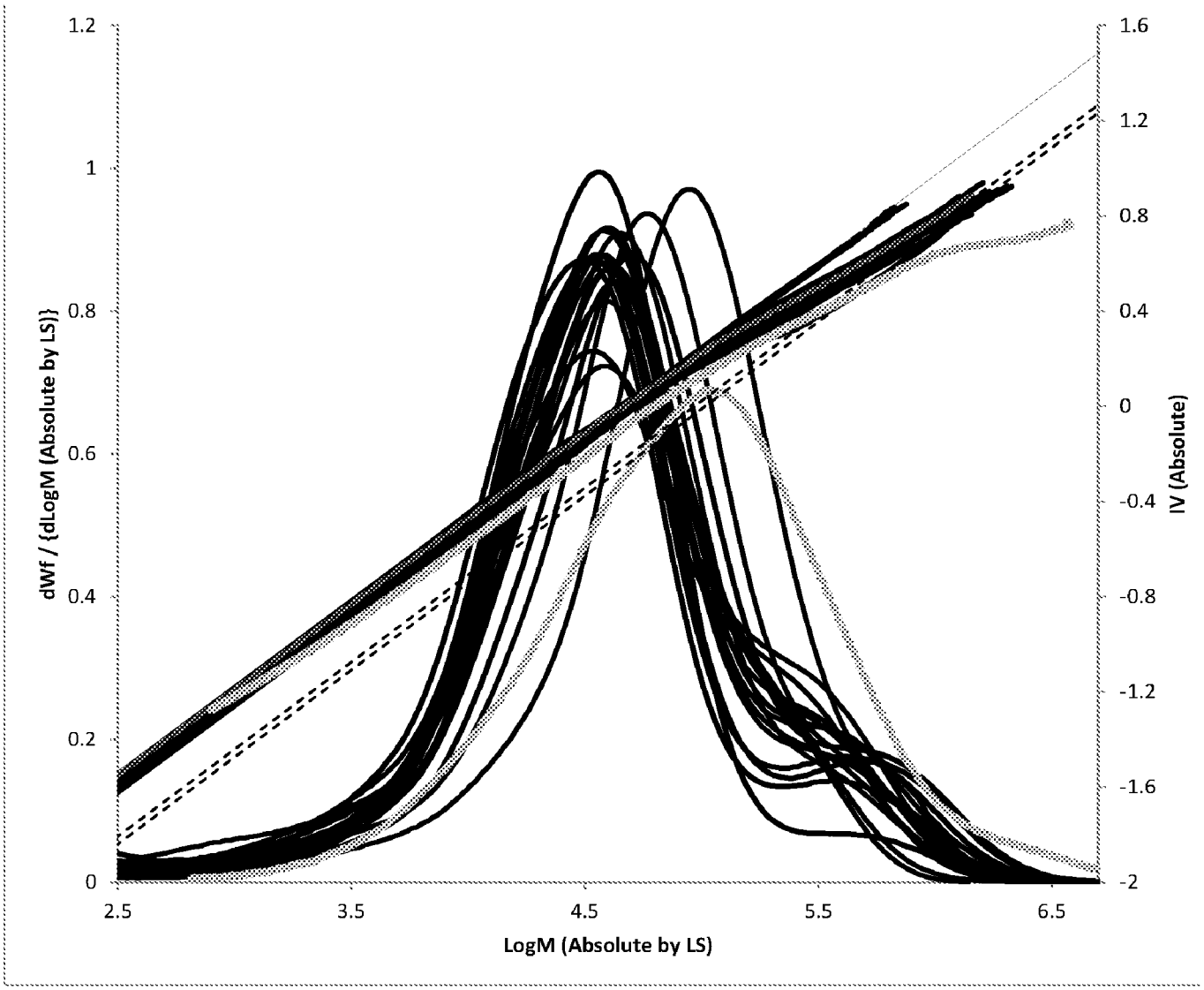

1.2
1
0.8
0.6
0.4
0.2
0
dWf / {dLogM (Absolute by LS)}
1.6
1.2
0.8
0.4
0
-0.4
-0.8
-1.2
-1.6
-2
IV (Absolute)
2.5
3.5
4.5
5.5
6.5
LogM (Absolute by LS)

FIG. 7

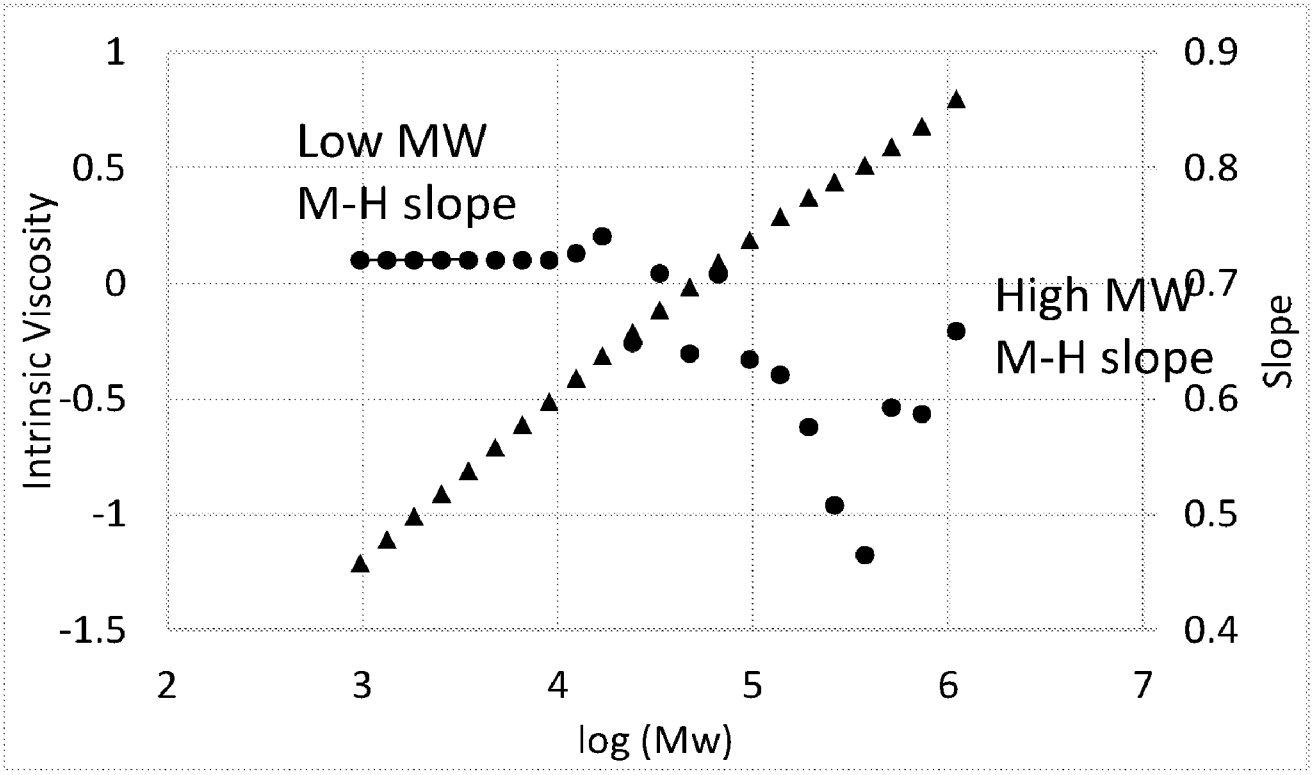

Low MW
M-H slope
High MW
M-H slope
Intrinsic Viscosity
Slope
log (Mw)
1
0.5
0
-0.5
-1
-1.5
0.9
0.8
0.7
0.6
0.5
0.4
2
3
4
5
6
7

FIG. 8

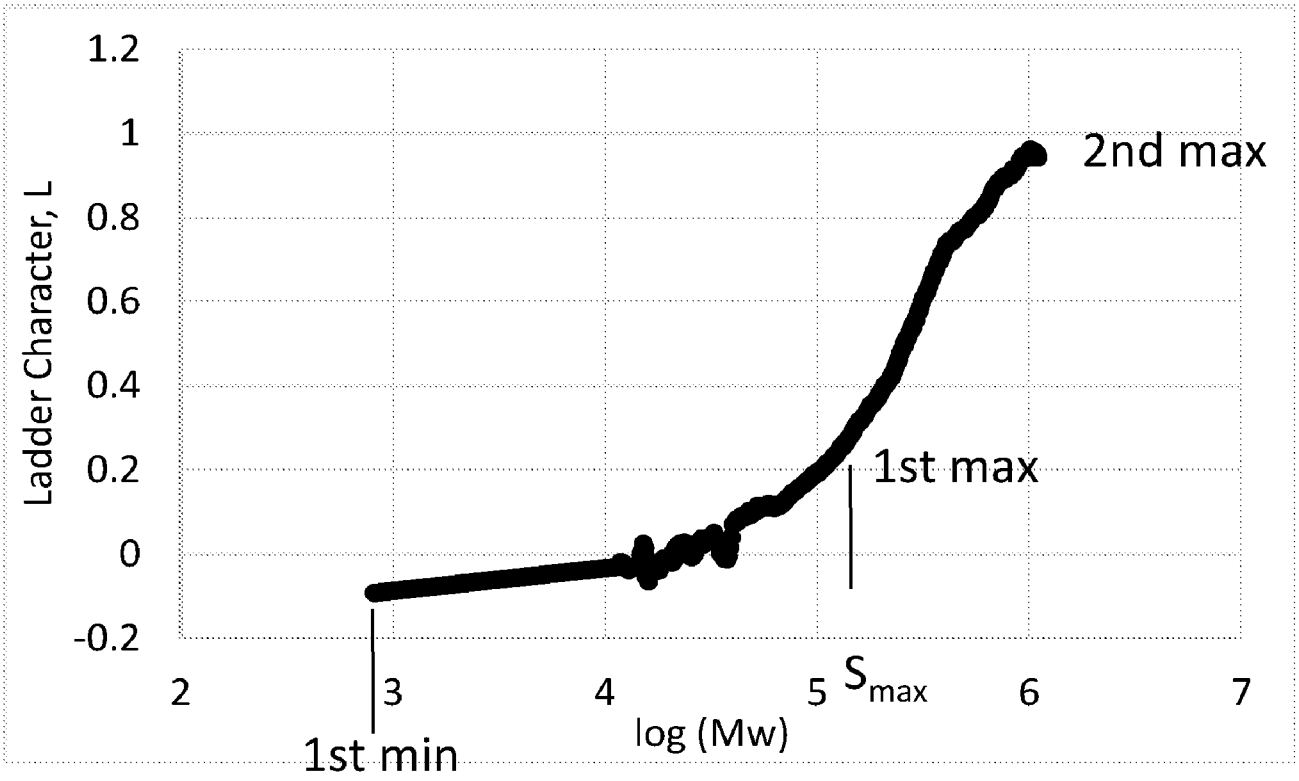

1.2
1
0.8
0.6
0.4
0.2
0
-0.2
Ladder Character, L
2
3
4
5
6
7
log (Mw)
2nd max
1st max
S_{max}
1st min

FIG. 9

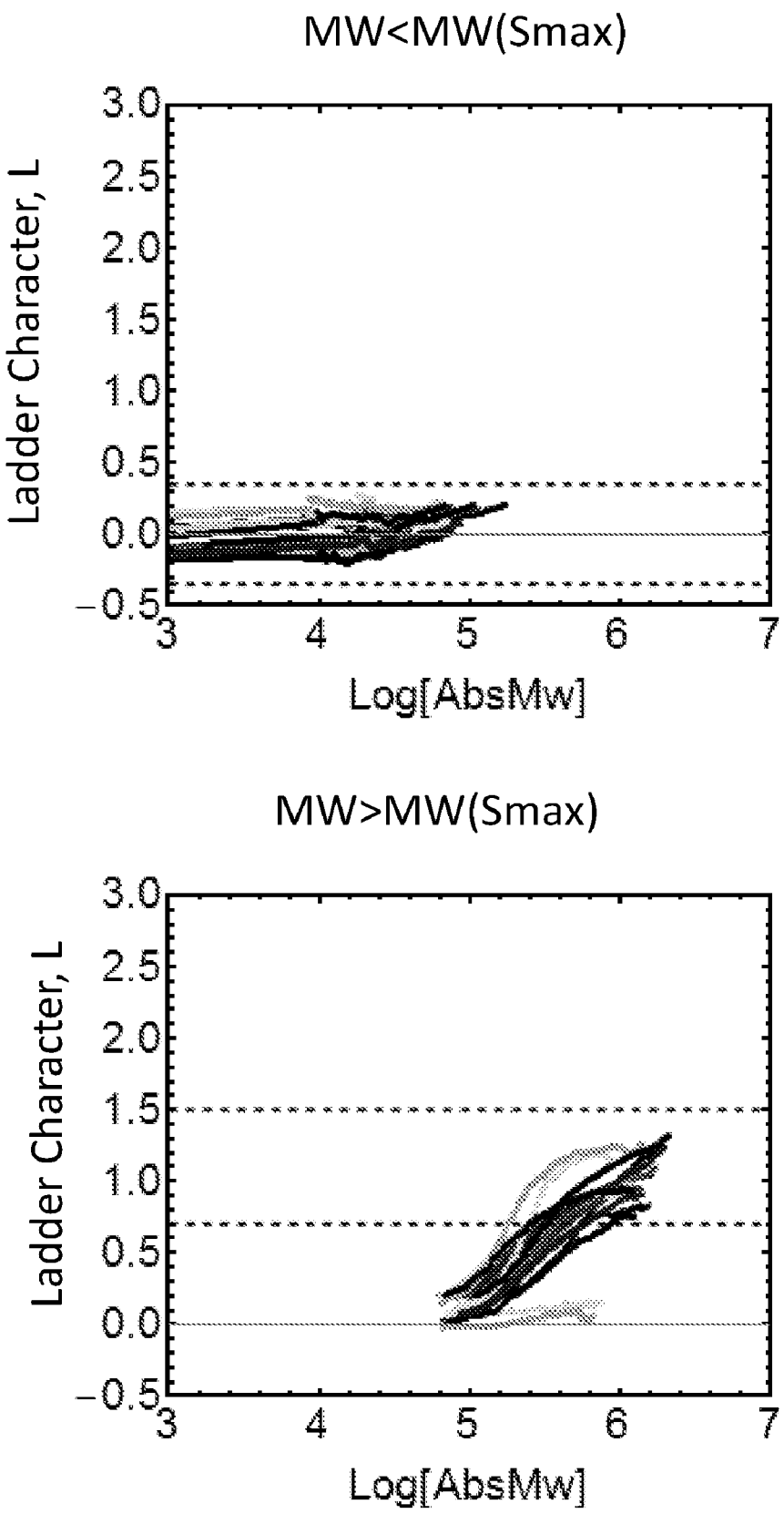

MW<MW(Smax)
Ladder Character, L
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
3
4
5
6
7
Log[AbsMw]
MW>MW(Smax)
Ladder Character, L
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
3
4
5
6
7
Log[AbsMw]

FIG. 10

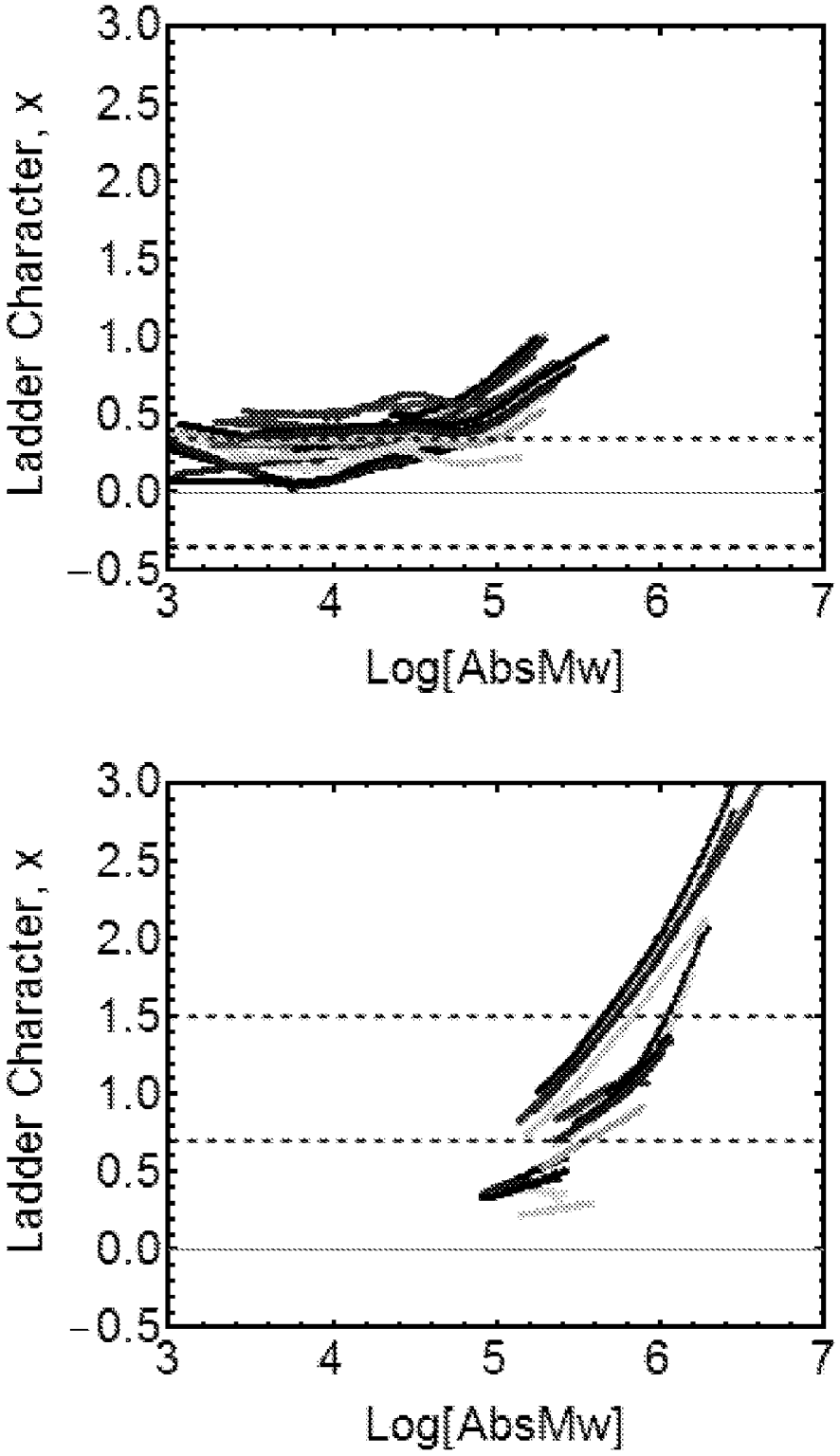

Ladder Character, x
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
3
4
5
6
7
Log[AbsMw]
Ladder Character, x
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
3
4
5
6
7
Log[AbsMw]

FIG. 11

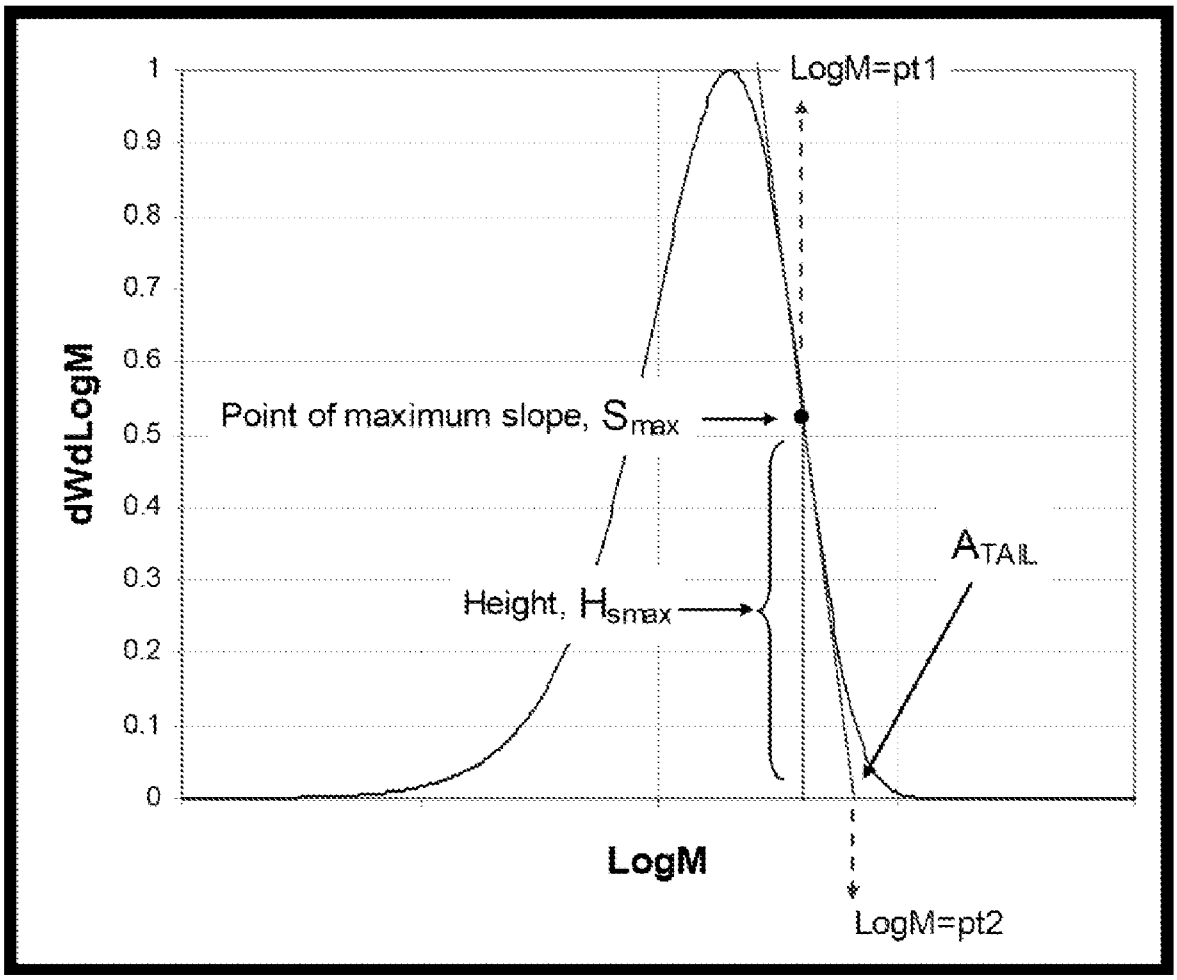

LogM=pt1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
dWdLogM
Point of maximum slope, S_{max}
Height, H_{smax}
A_{TAIL}
LogM
LogM=pt2

FIG. 12

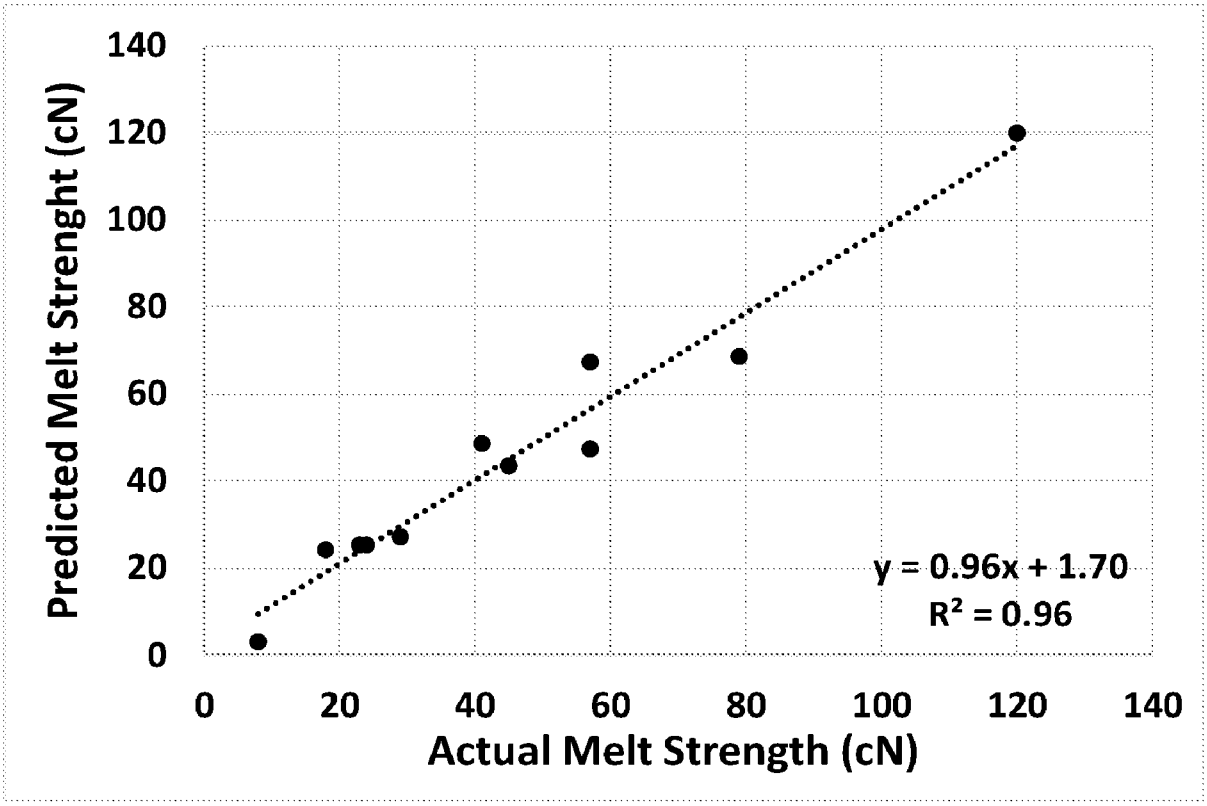

Predicted Melt Strenght (cN)
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
Actual Melt Strength (cN)
y = 0.96x + 1.70
R² = 0.96

FIG. 13

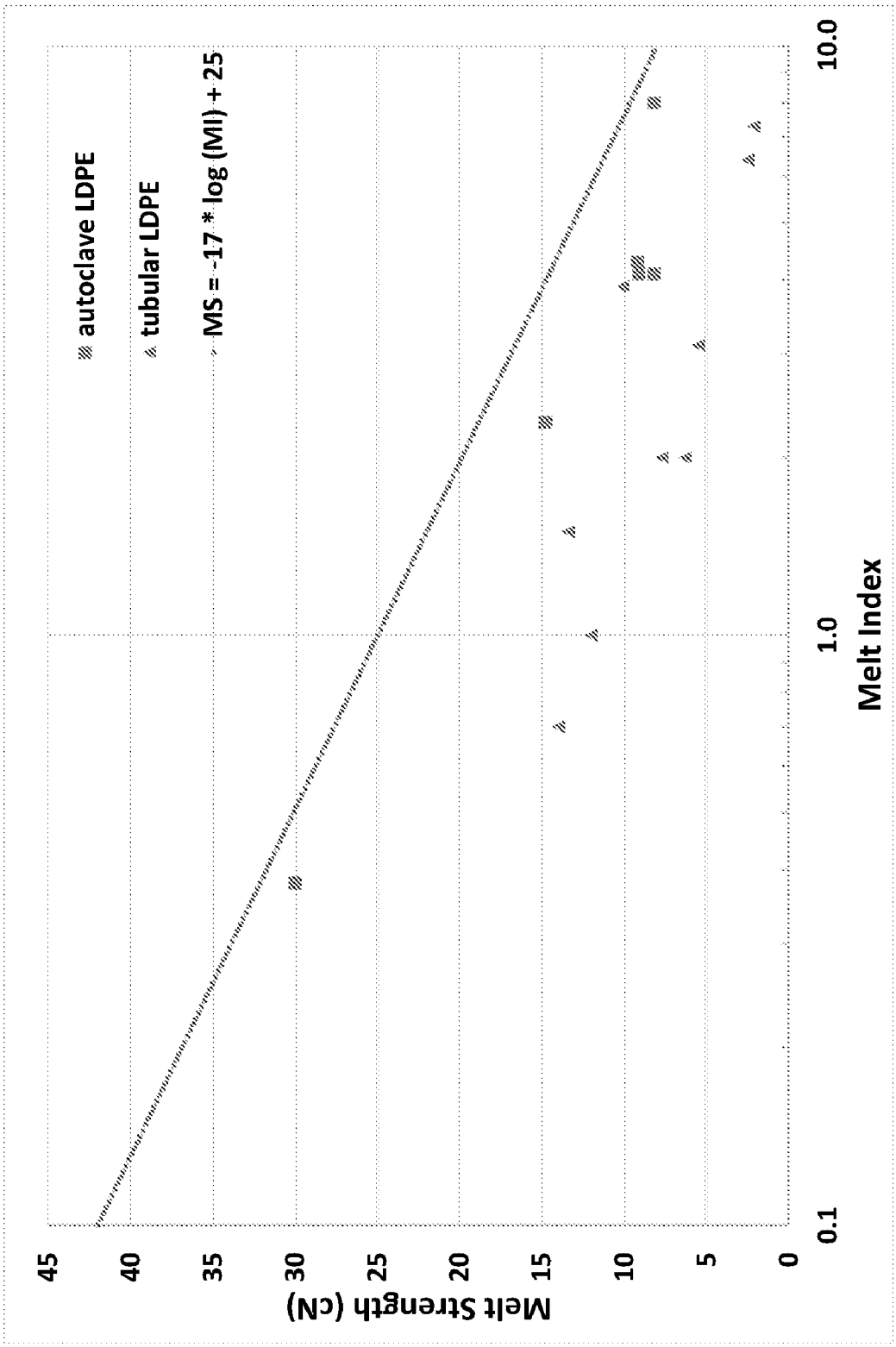

autoclave LDPE
tubular LDPE
MS = -17 * log (MI) + 25
Melt Strength (cN)
45
40
35
30
25
20
15
10
5
0
0.1
1.0
10.0
Melt Index

FIG. 14

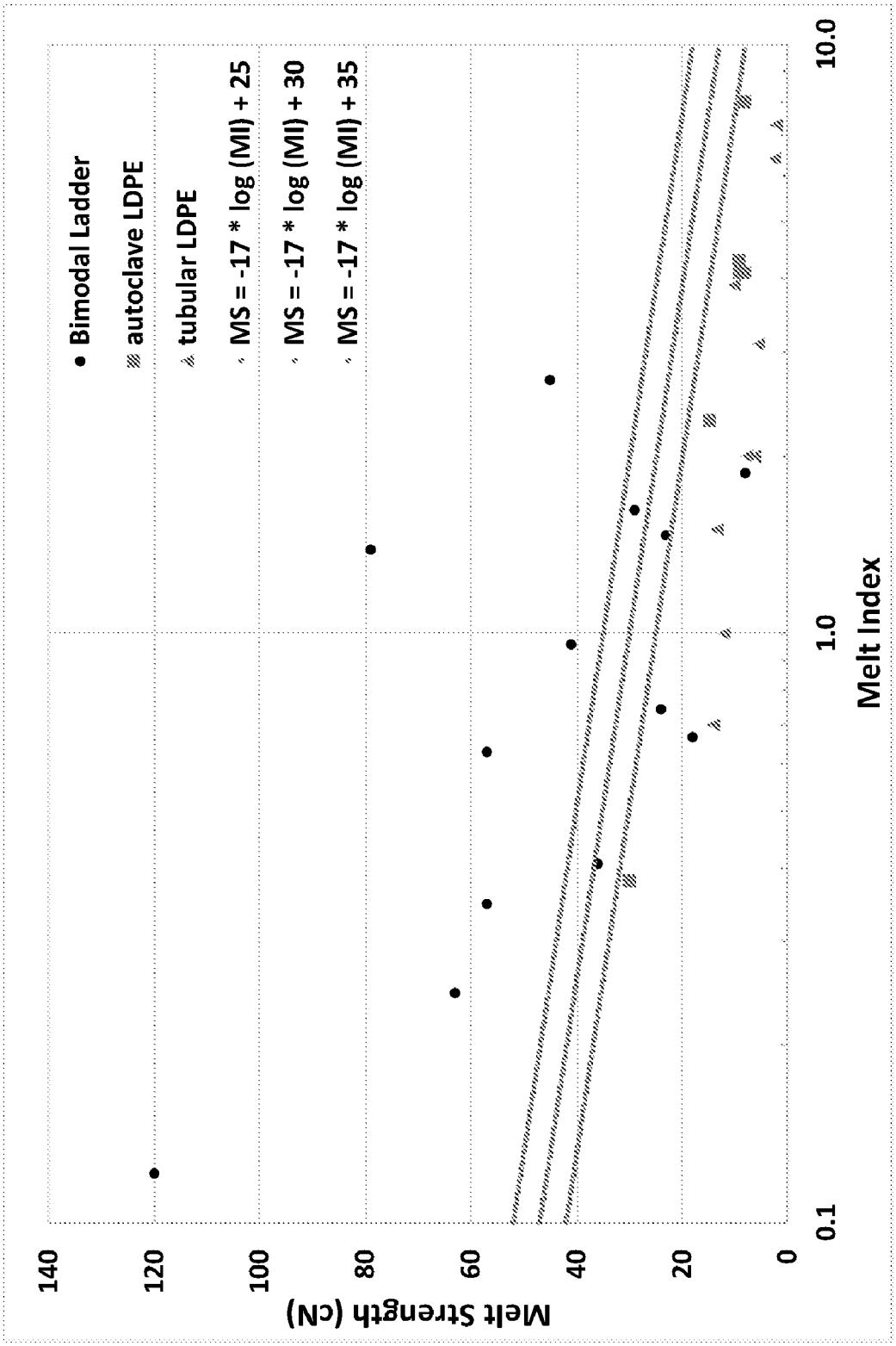

Bimodal Ladder
autoclave LDPE
tubular LDPE
MS = -17 * log (MI) + 25
MS = -17 * log (MI) + 30
MS = -17 * log (MI) + 35
Melt Strength (cN)
140
120
100
80
60
40
20
0
0.1
1.0
10.0
Melt Index

FIG. 15