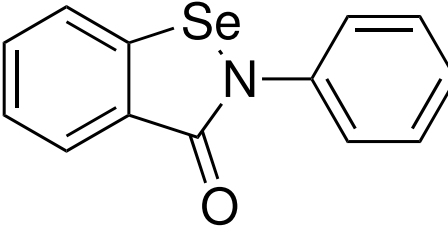
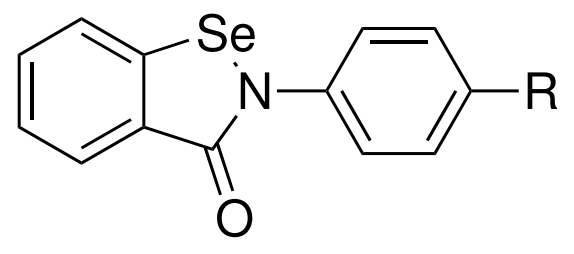
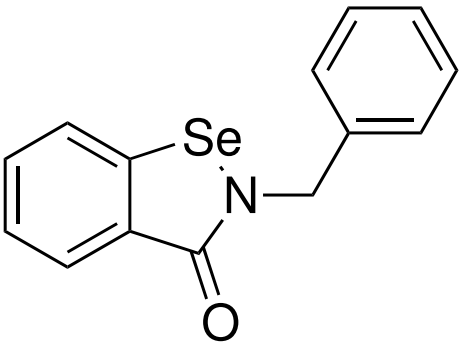
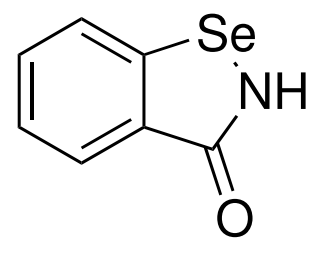
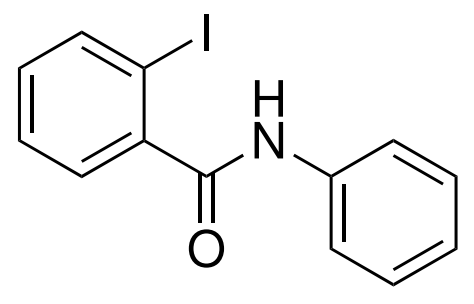
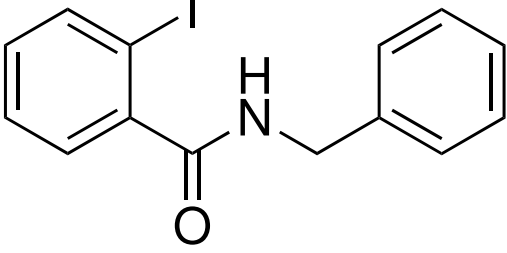

Se
N
O

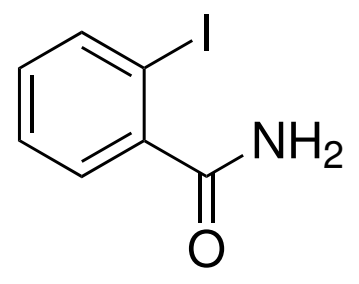

Se
N
R
O

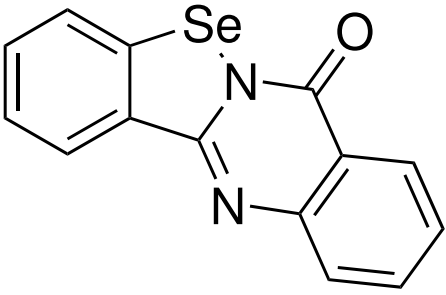

Se
N
O

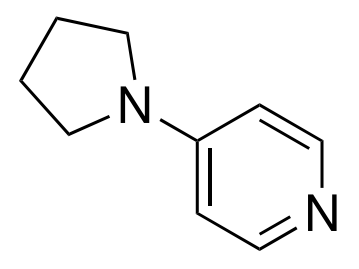

Se
NH
O

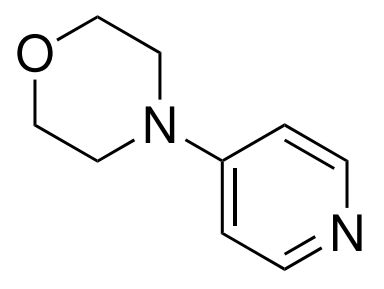

I
H
N
O

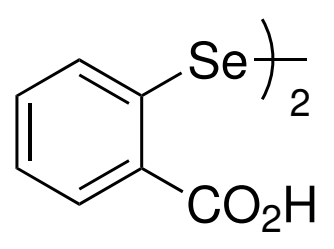

I
H
N
O

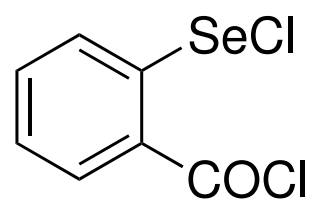

I
NH2
O

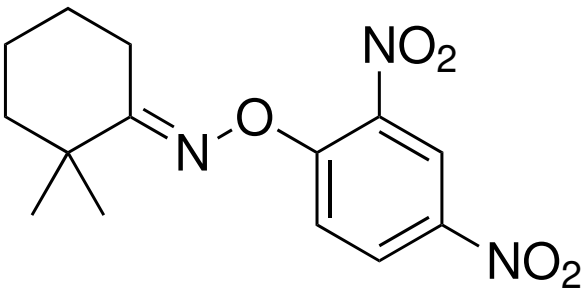

Se
N
O
N

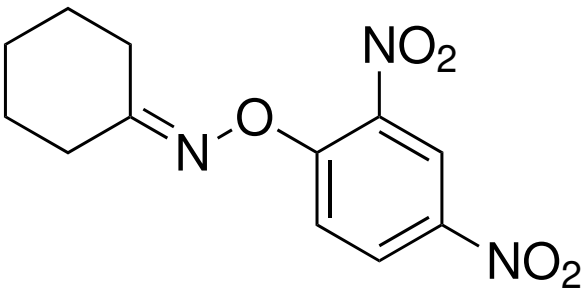

N
N

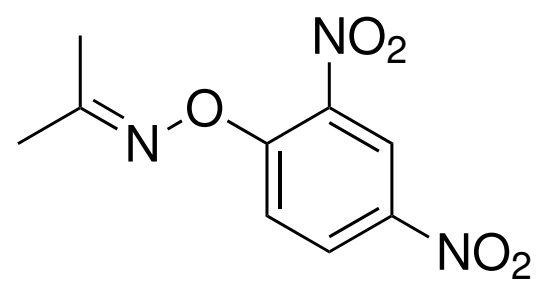

O
N
N

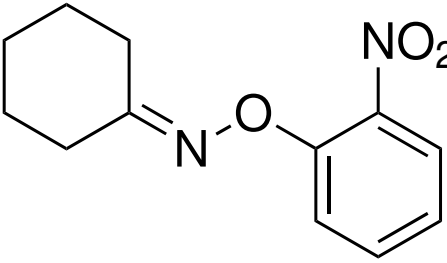

Se
2
CO2H

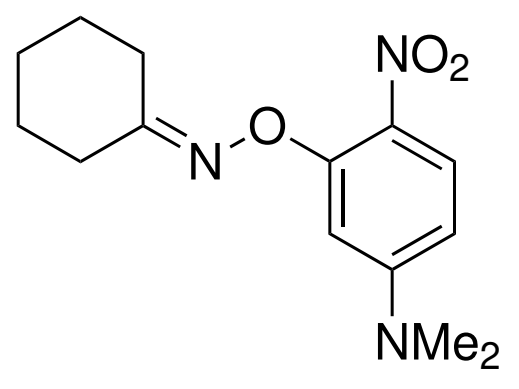

SeCl
COCl

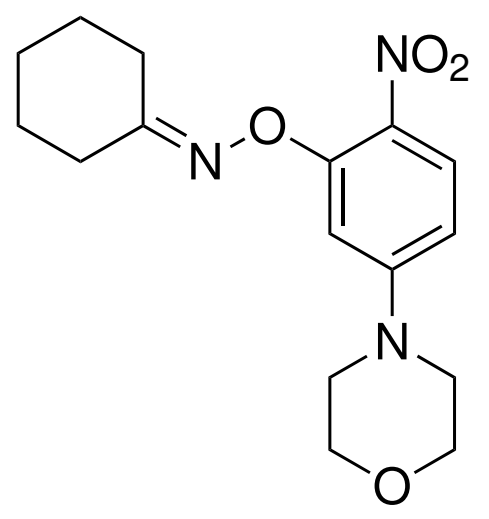

NO2
N
O
NO2

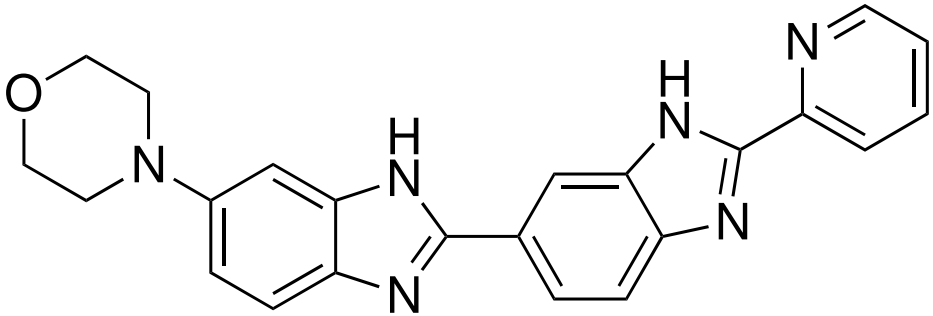

NO2
N
O
NO2

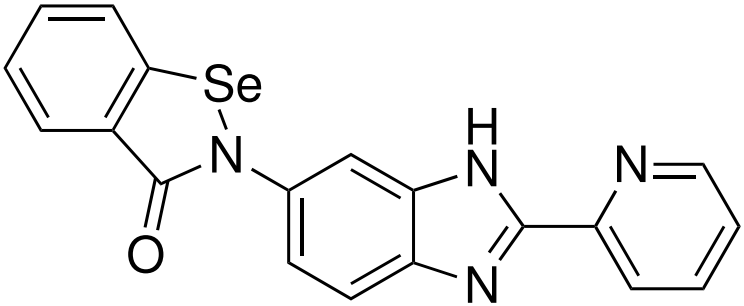

NO2
N
O
NO2

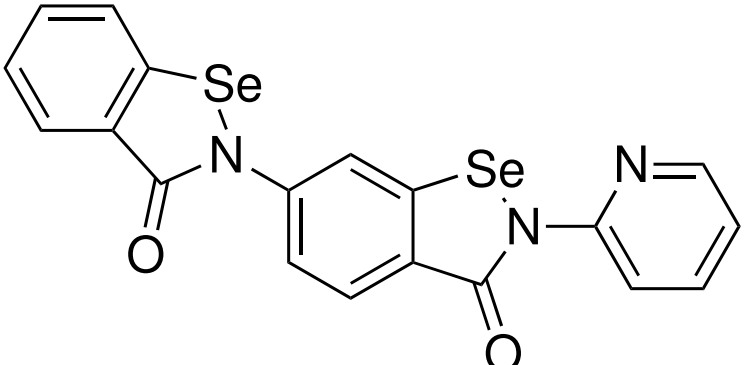

NO2
N
O

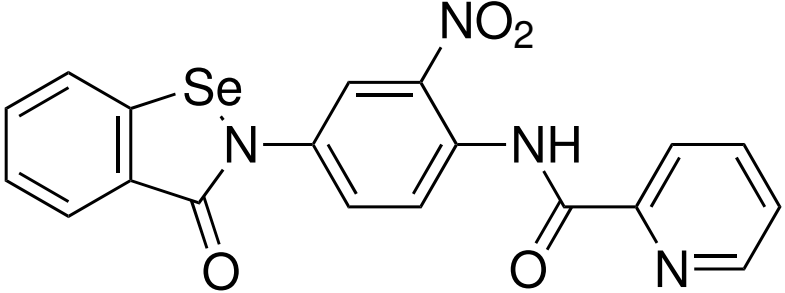

NO2
N
O
NMe2

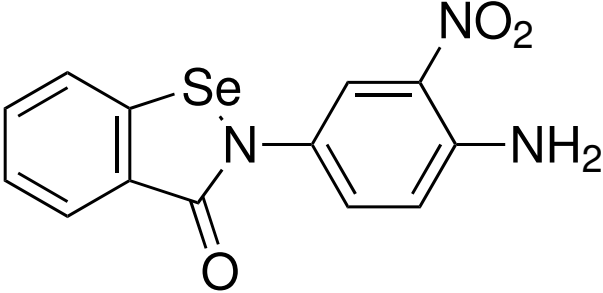

NO2
N
O
N
O

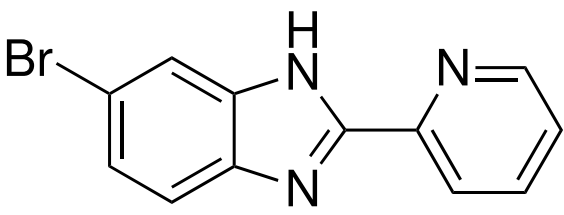

O
N
H
N
N
H
N
N
N

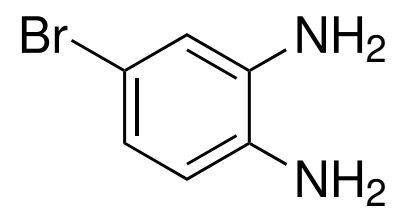

Se
N
O
H
N
N
N

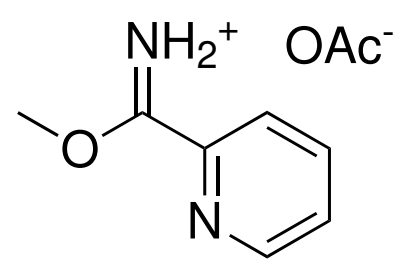

Se
N
O
Se
N
N
O

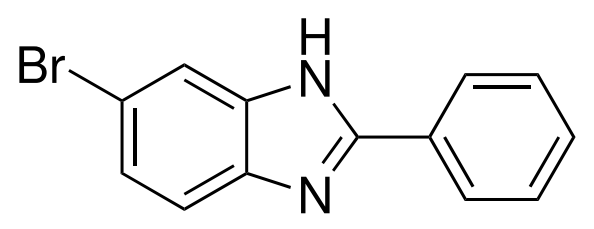

NO2
Se
N
NH
O
O
N

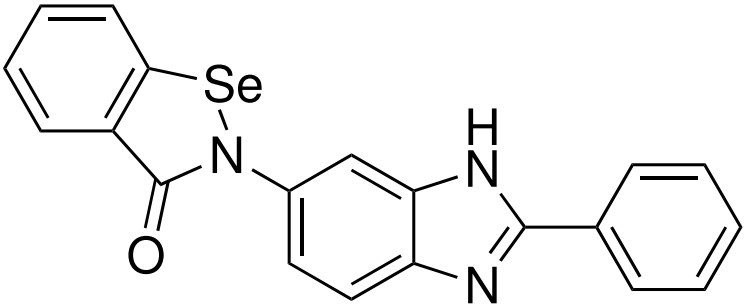

NO2
Se
N
NH2
O

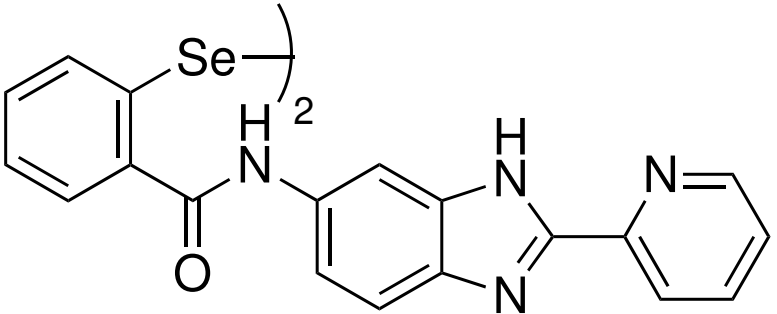

Br
H
N
N
N

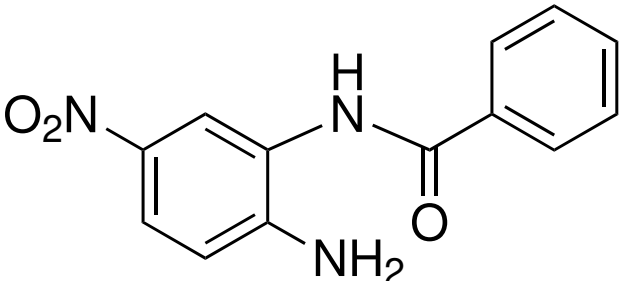

Br
NH2
NH2

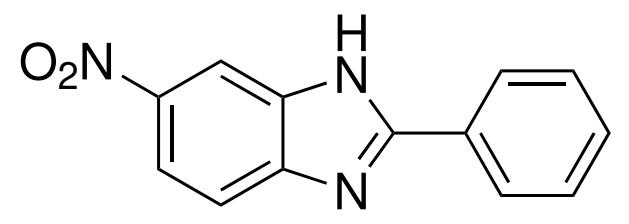

NH2+
OAc-
O
N

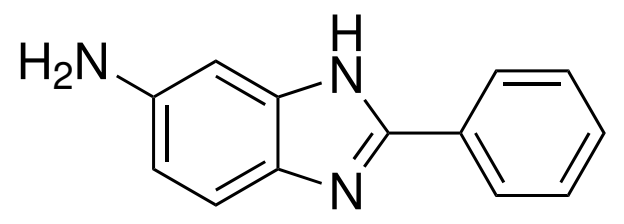

Br
H
N
N

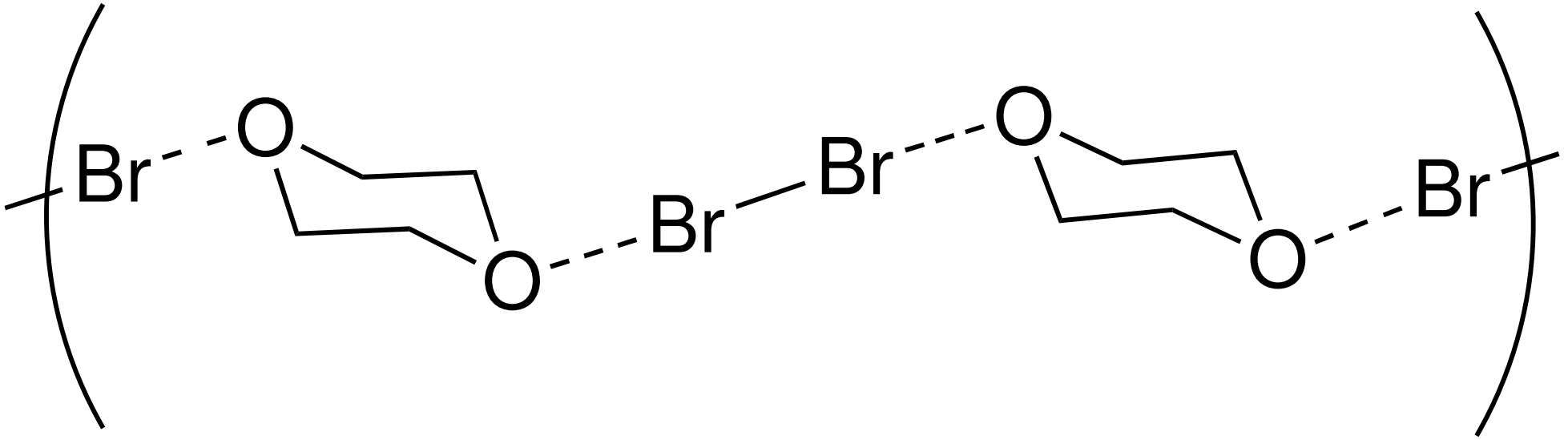

Se
N
O
H
N
N

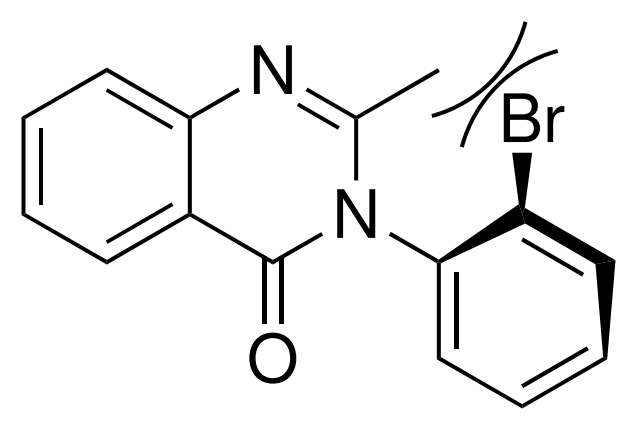

Se
H
2
N
H
N
N
O
N

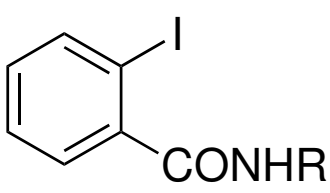

O2N
H
N
O
NH2


O2N
H
N
N


H2N
H
N
N

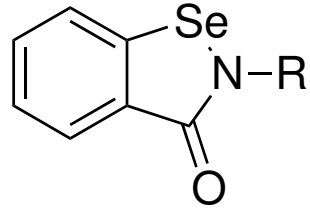

Br
O
O
Br
Br
O
O
Br


N
N
Br
O



CuI, 1,10-phenanthroline,
Se, K_2CO_3

DMF, 110°C, 5h

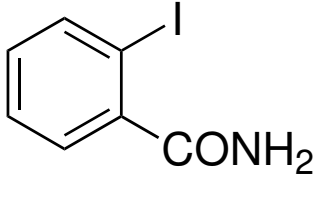


1 R = Ph, 69%

1a R = Bn, 53%

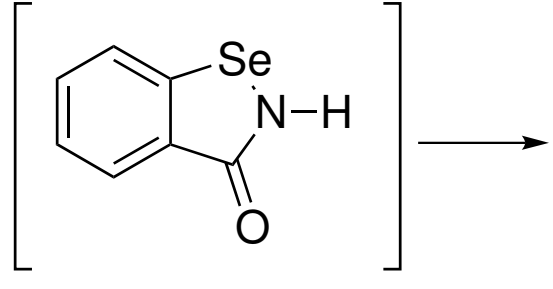
2 and **2a**

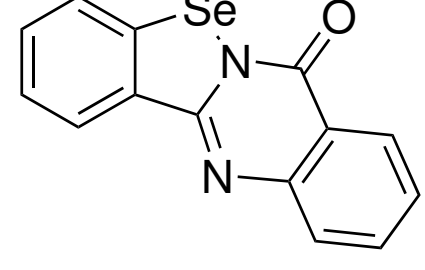
1 and **1a**



CuI, 1,10-phenanthroline,
Se, K_2CO_3

DMF, 110°C, 5h, 15%

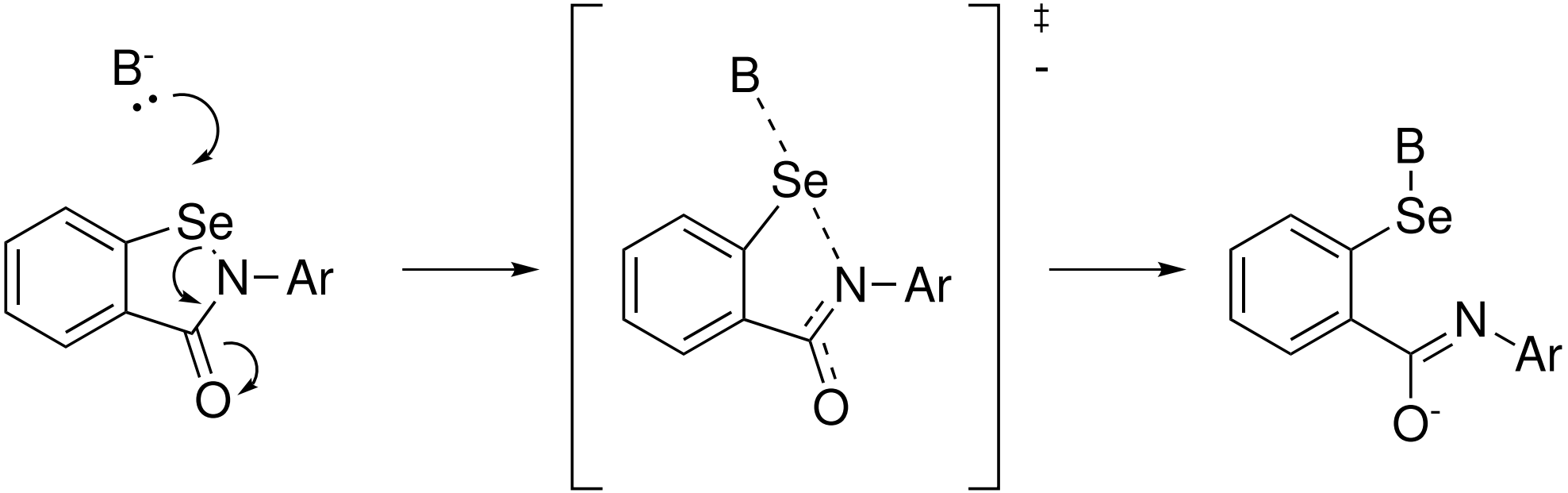


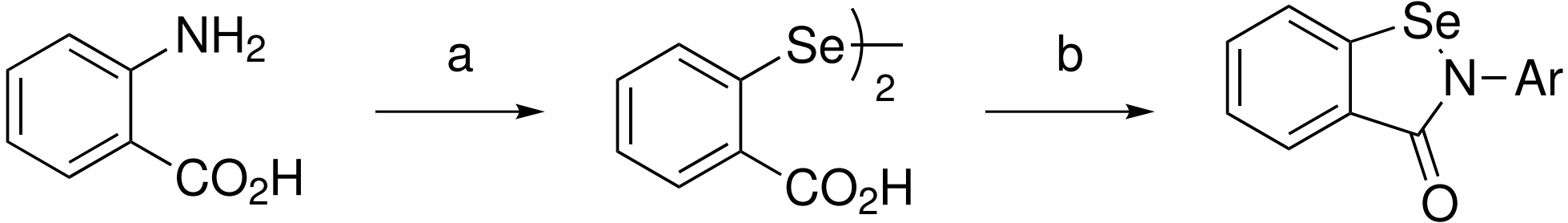


2b

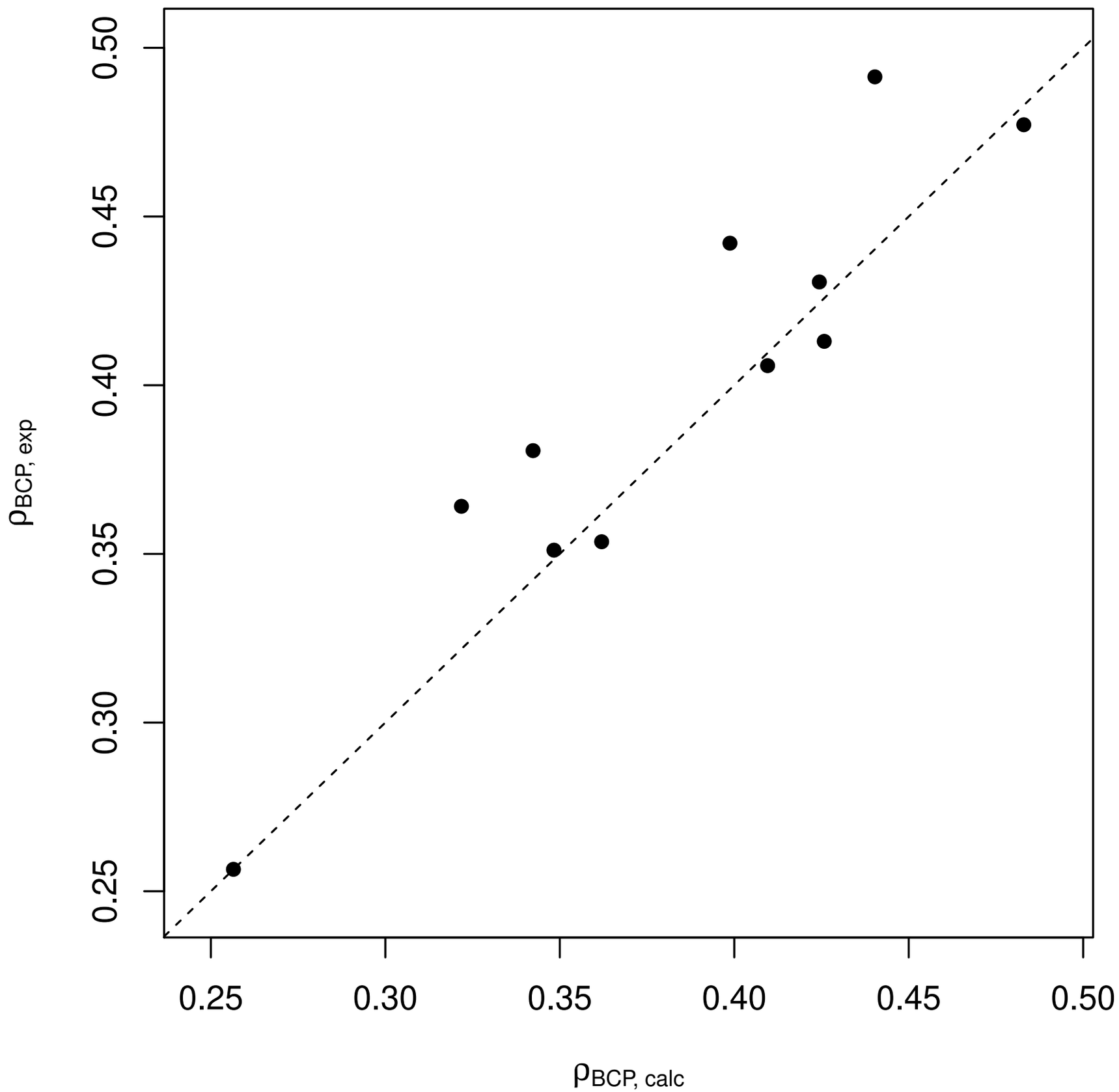
1b

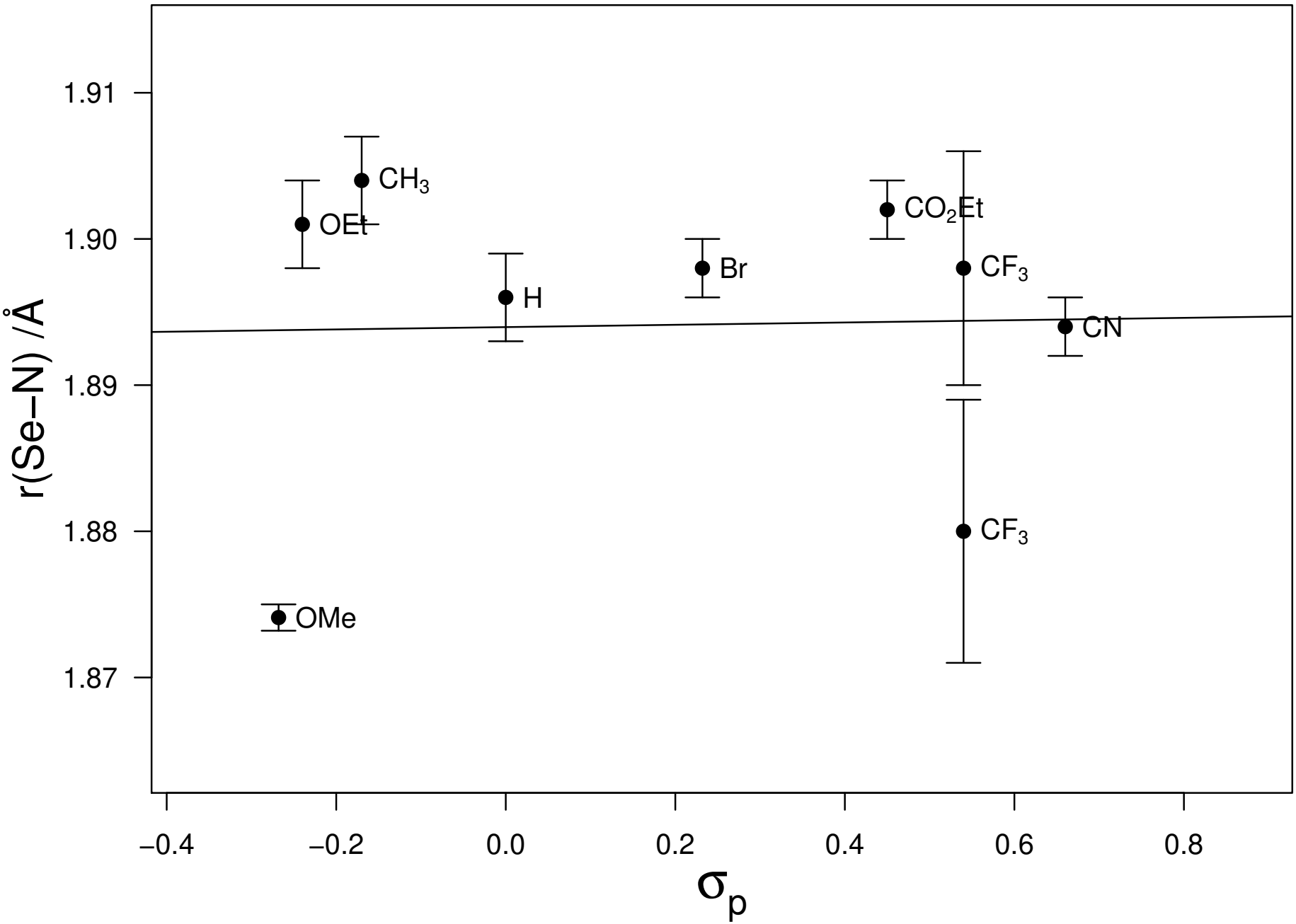
3

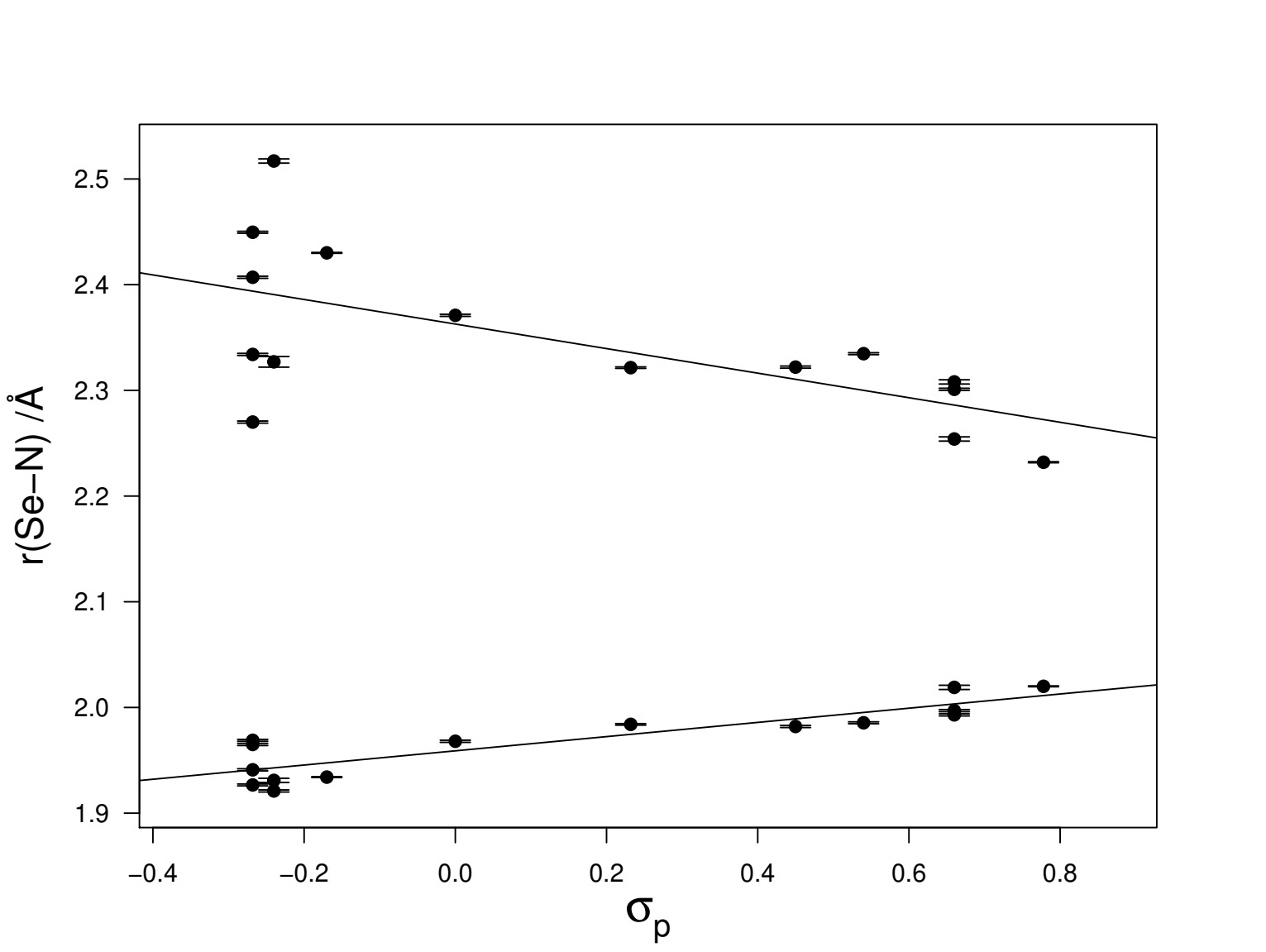

B-
Se
N
Ar
O
B
Se
N
Ar
O
‡
-
B
Se
N
Ar
O-

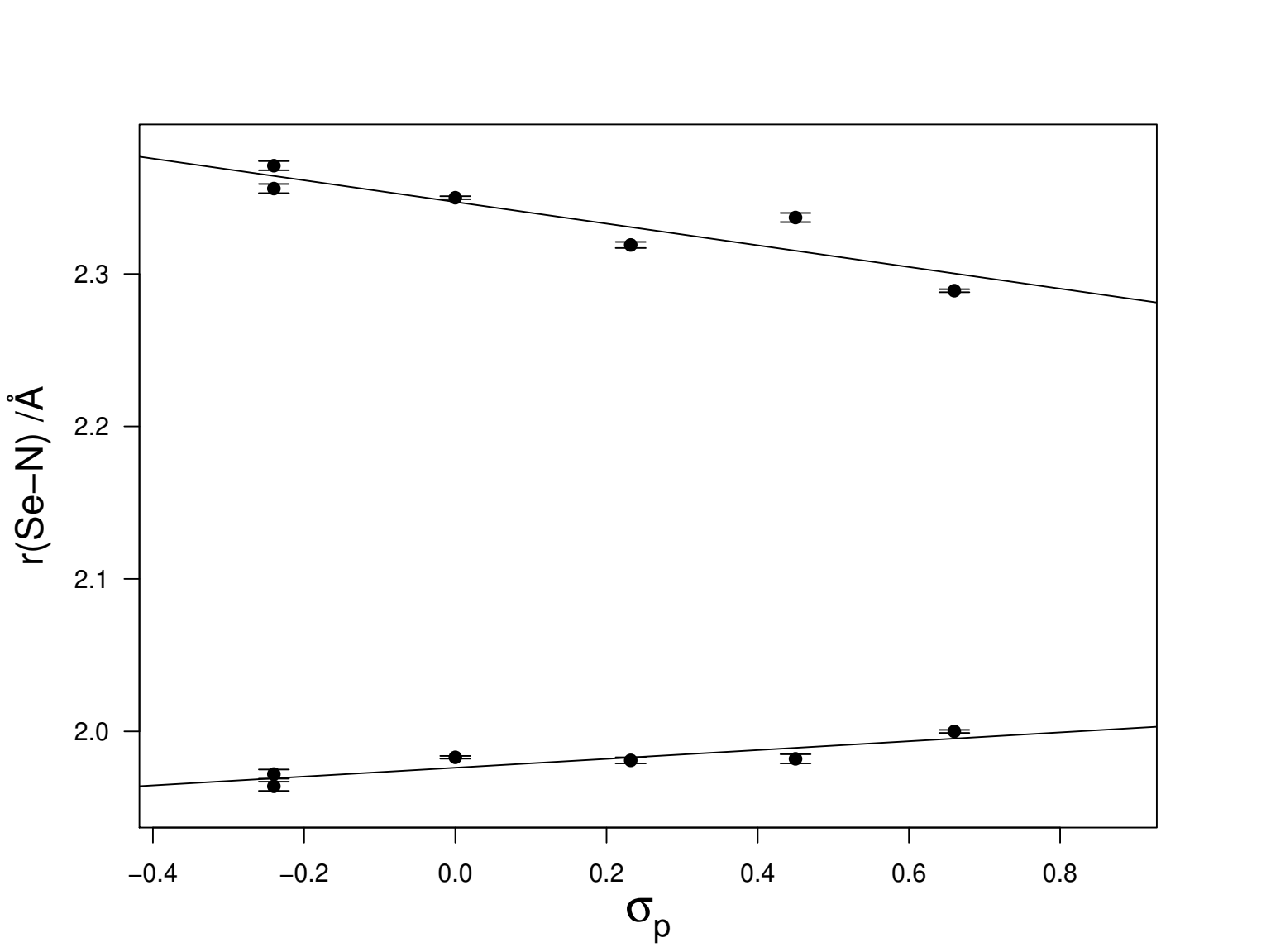


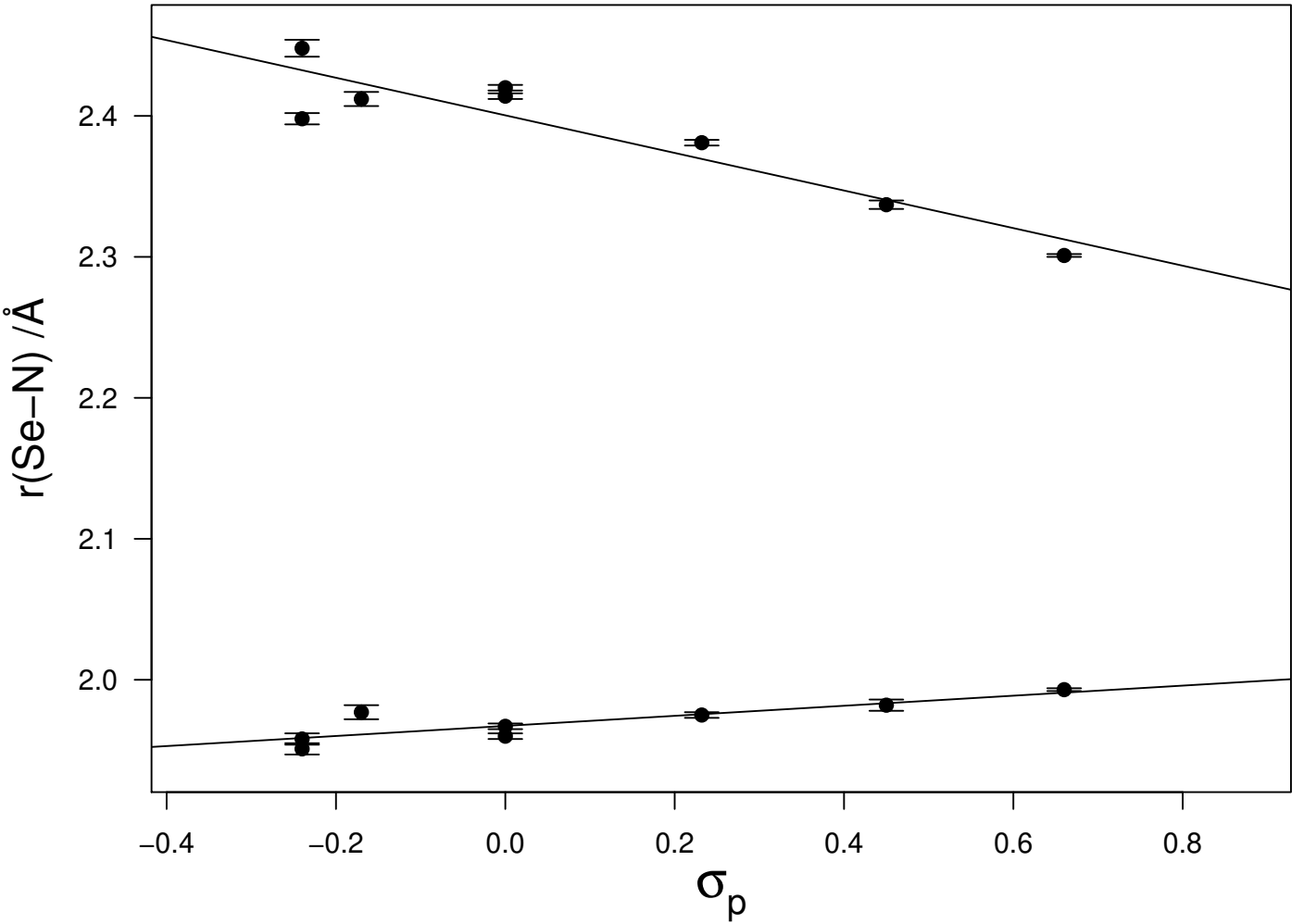
5 **1**

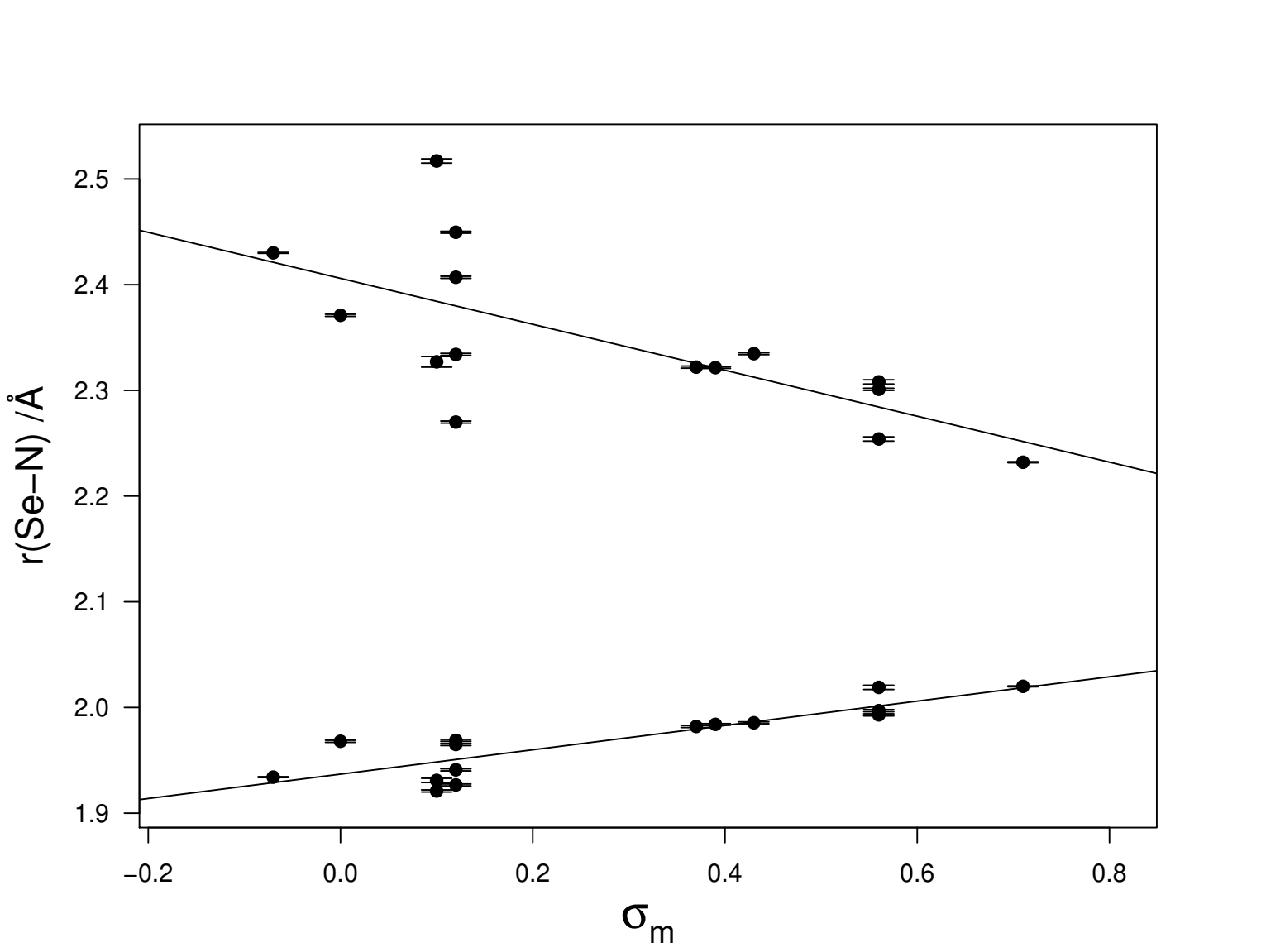

0.25
0.30
0.35
0.40
0.45
0.50
ρBCP, exp
ρBCP, calc

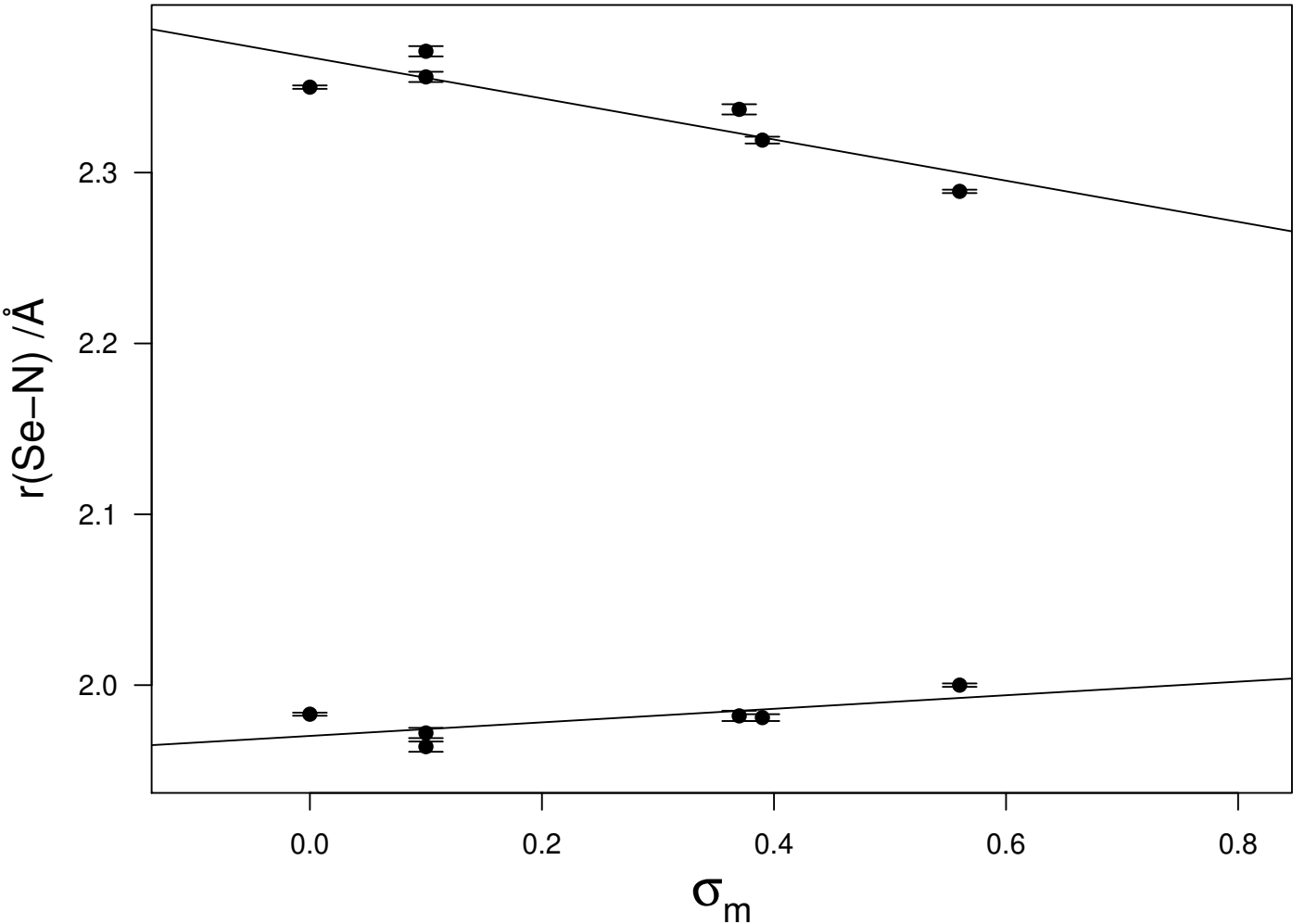

1.91
1.90
1.89
1.88
1.87
r(Se–N) /Å
CH3
OEt
H
Br
CO2Et
CF3
CN
CF3
OMe
–0.4
–0.2
0.0
0.2
0.4
0.6
0.8
σp

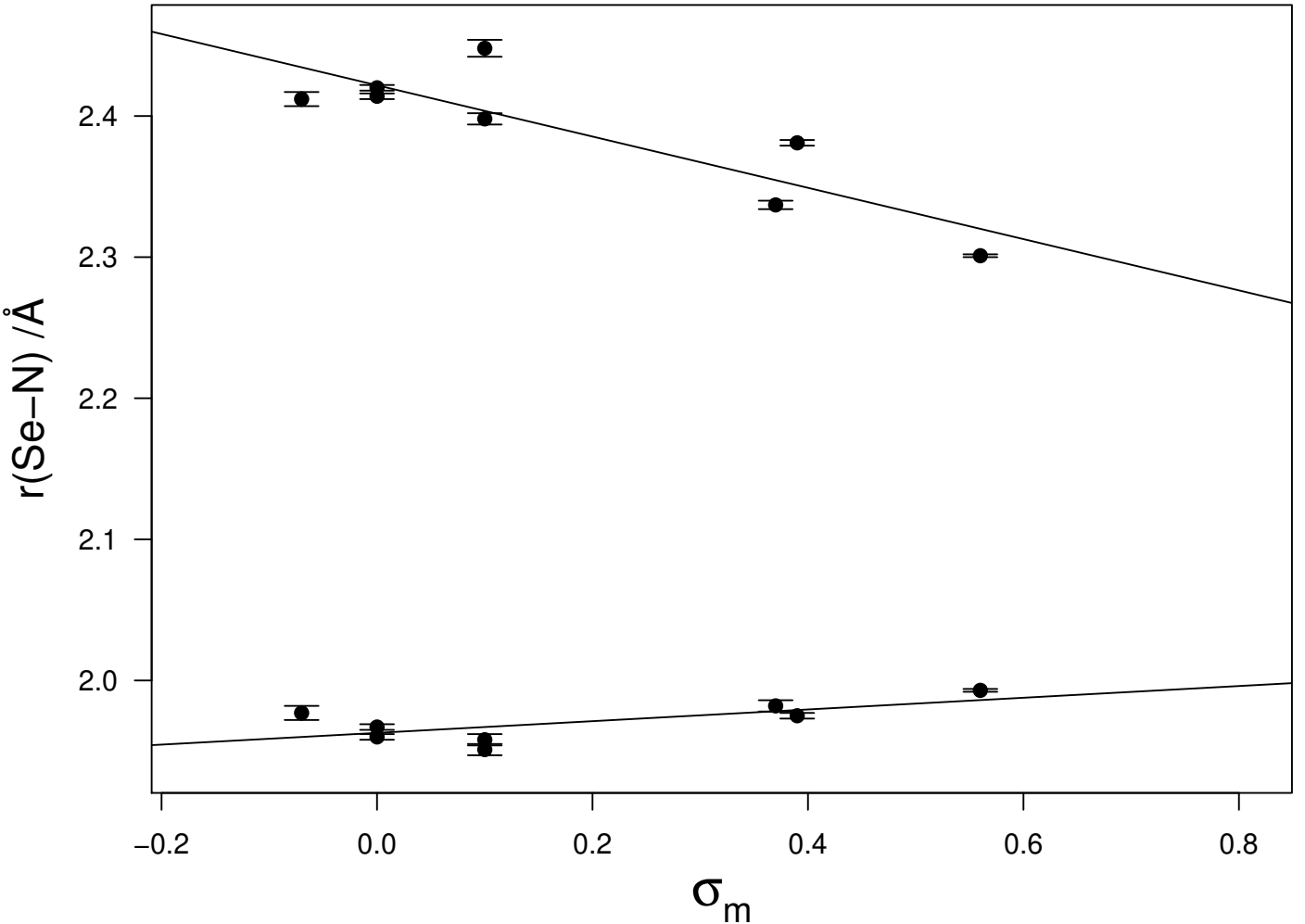

2.5
2.4
2.3
2.2
2.1
2.0
1.9
r(Se–N) /Å
–0.4
–0.2
0.0
0.2
0.4
0.6
0.8
σp

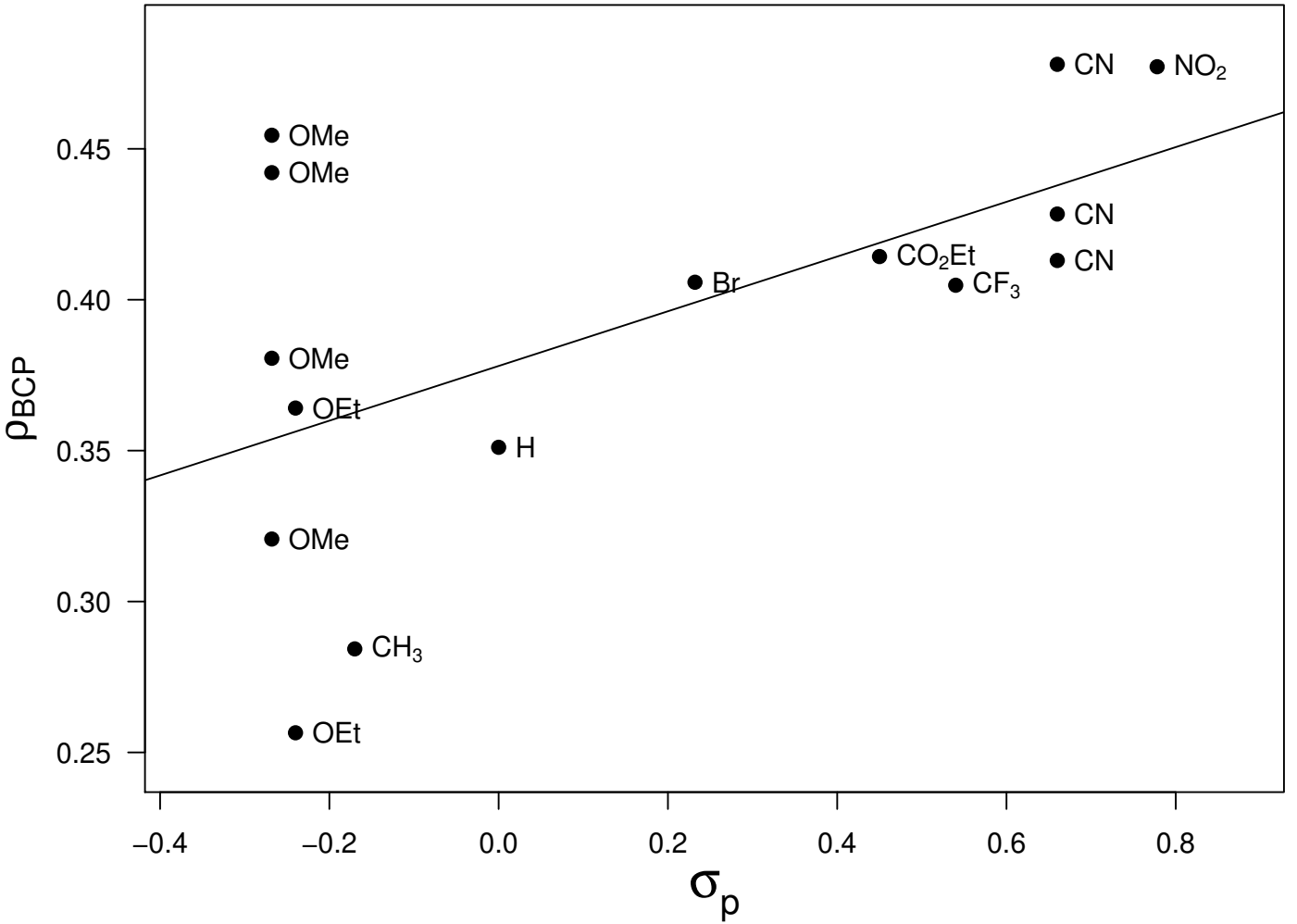

r(Se–N) /Å
2.3
2.2
2.1
2.0
–0.4
–0.2
0.0
0.2
0.4
0.6
0.8
σp

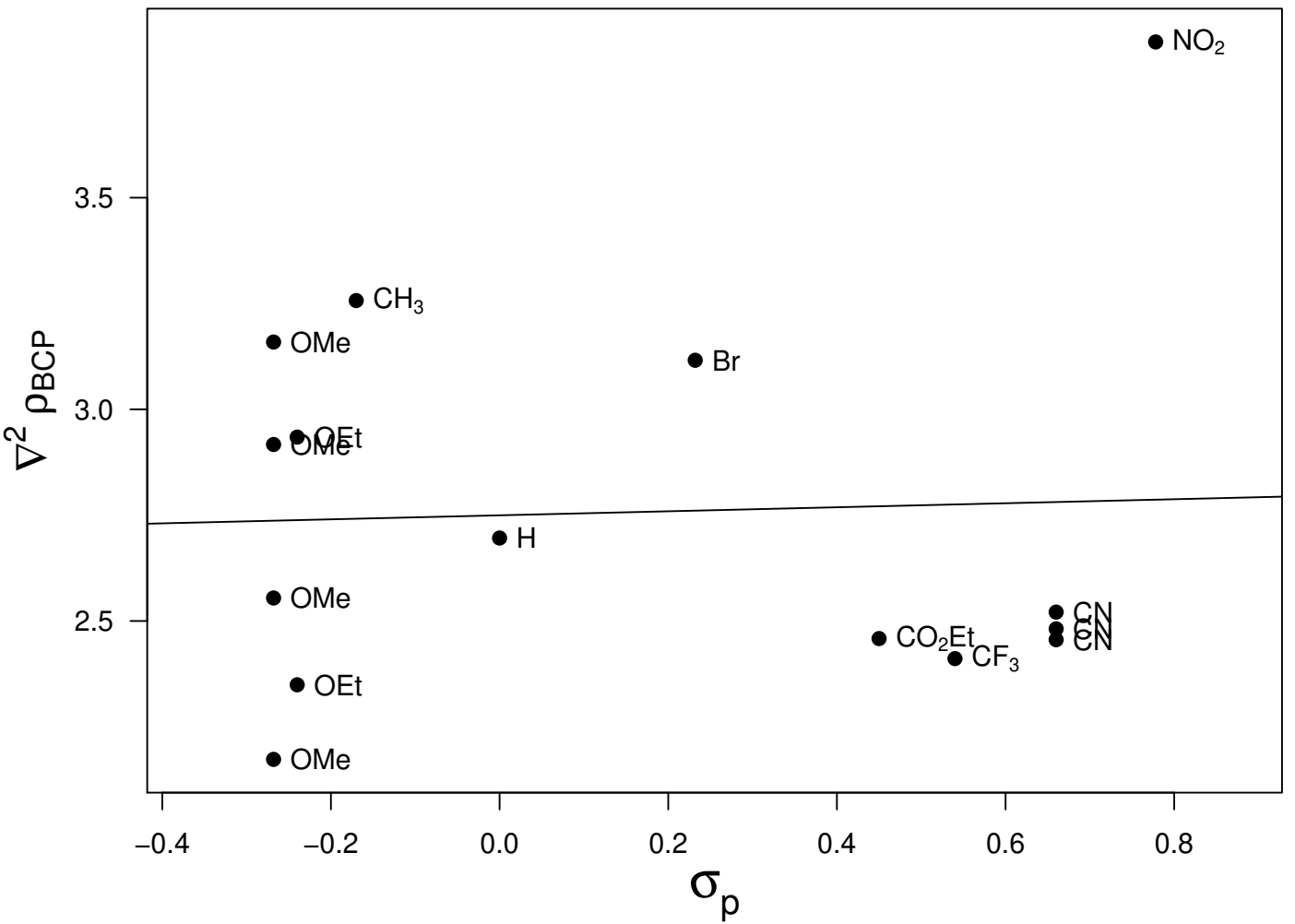

r(Se–N) /Å
2.4
2.3
2.2
2.1
2.0
–0.4
–0.2
0.0
0.2
0.4
0.6
0.8
σp

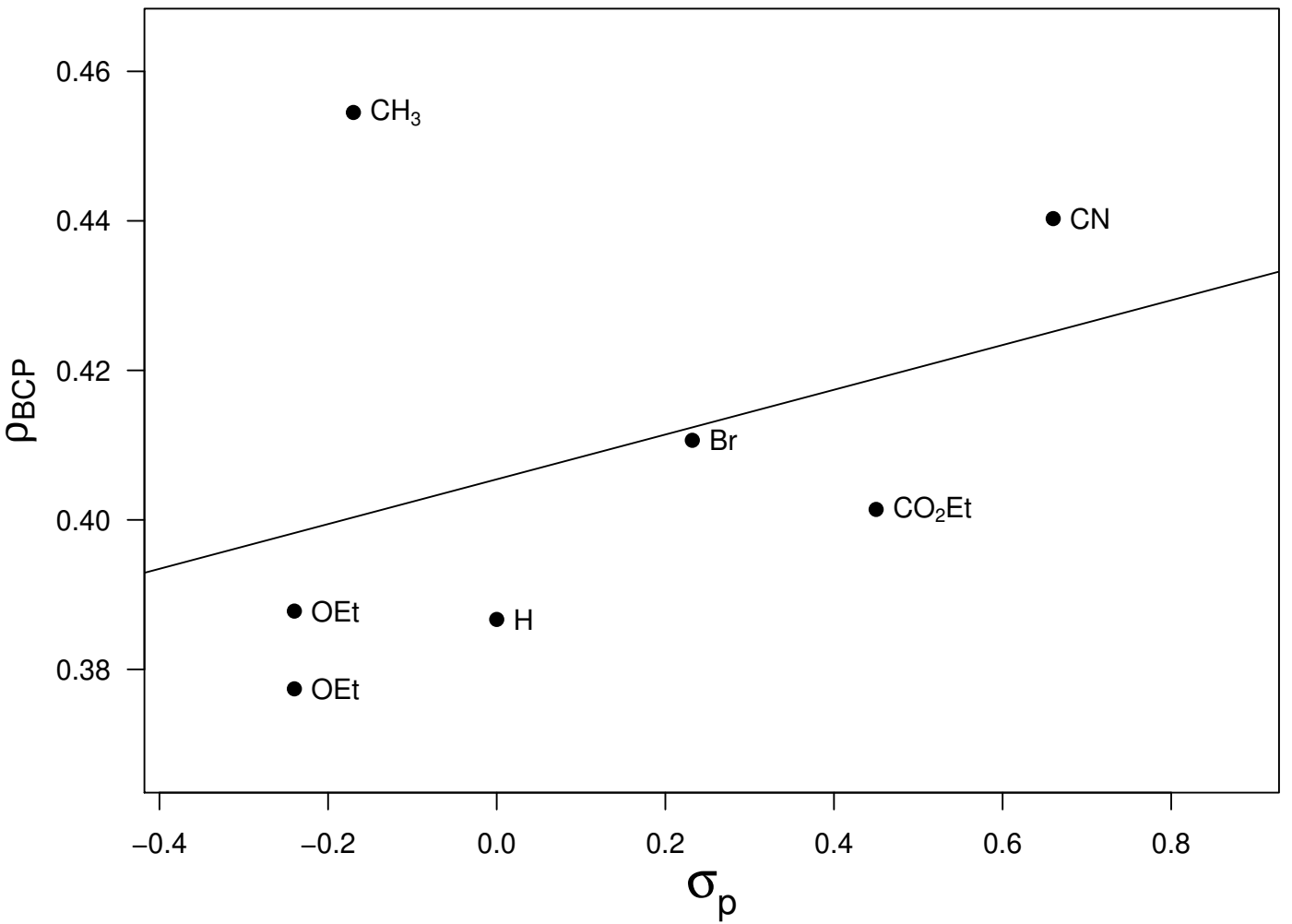

2.5
2.4
2.3
2.2
2.1
2.0
1.9
r(Se–N) /Å
–0.2
0.0
0.2
0.4
0.6
0.8
σm

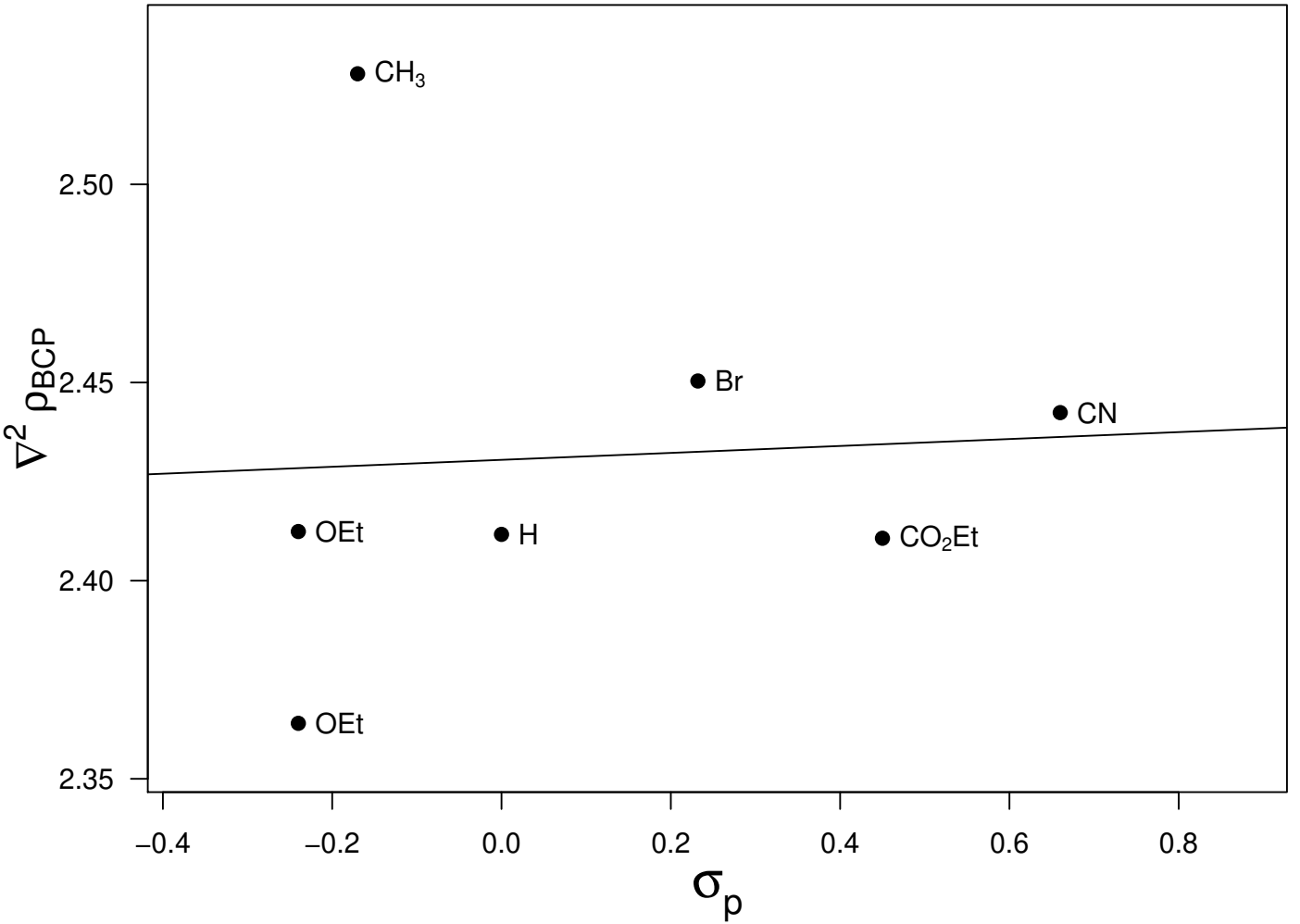

r(Se–N) /Å
2.3
2.2
2.1
2.0
0.0
0.2
0.4
0.6
0.8
σm

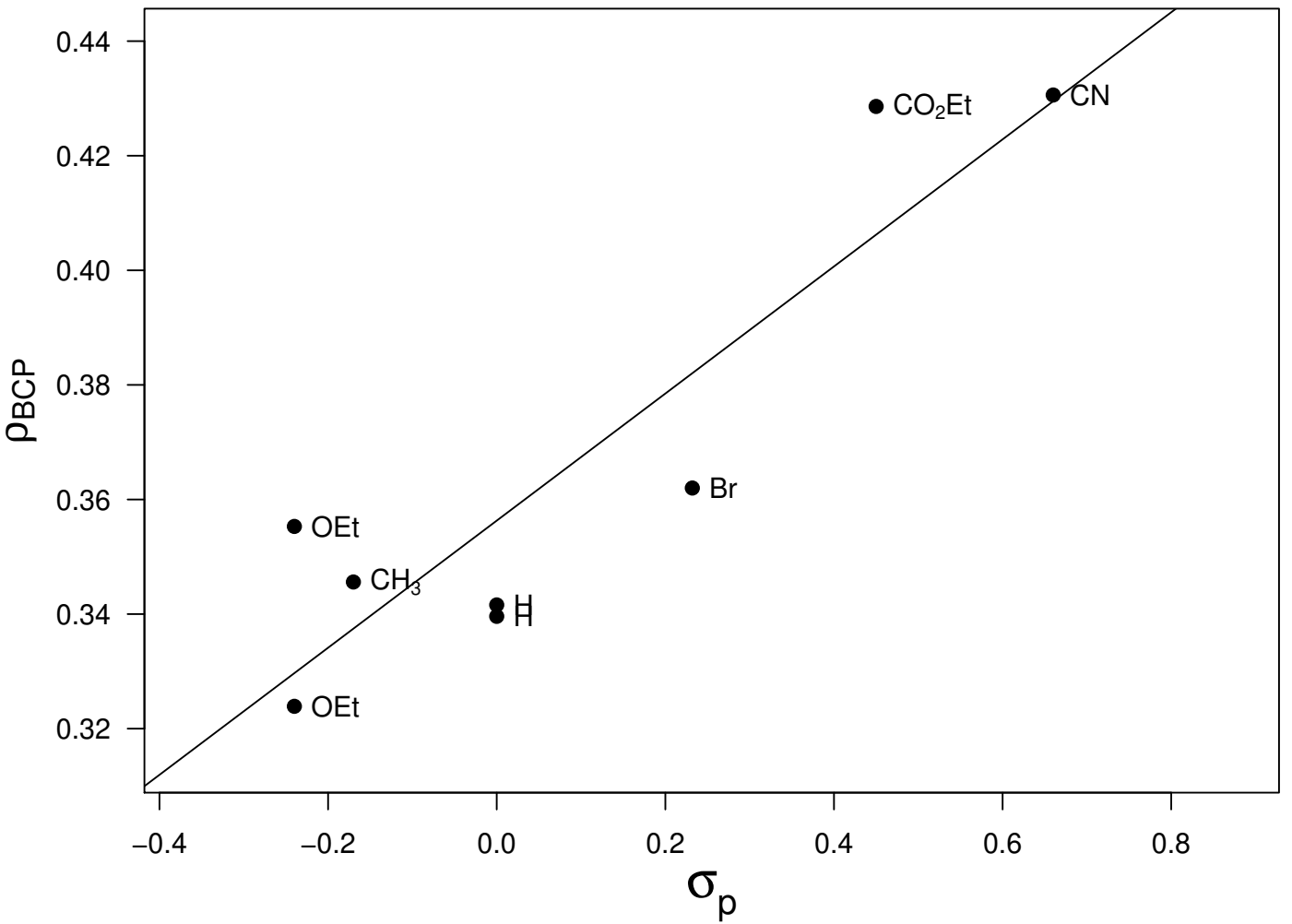

r(Se–N) /Å
2.4
2.3
2.2
2.1
2.0
–0.2
0.0
0.2
0.4
0.6
0.8
σm

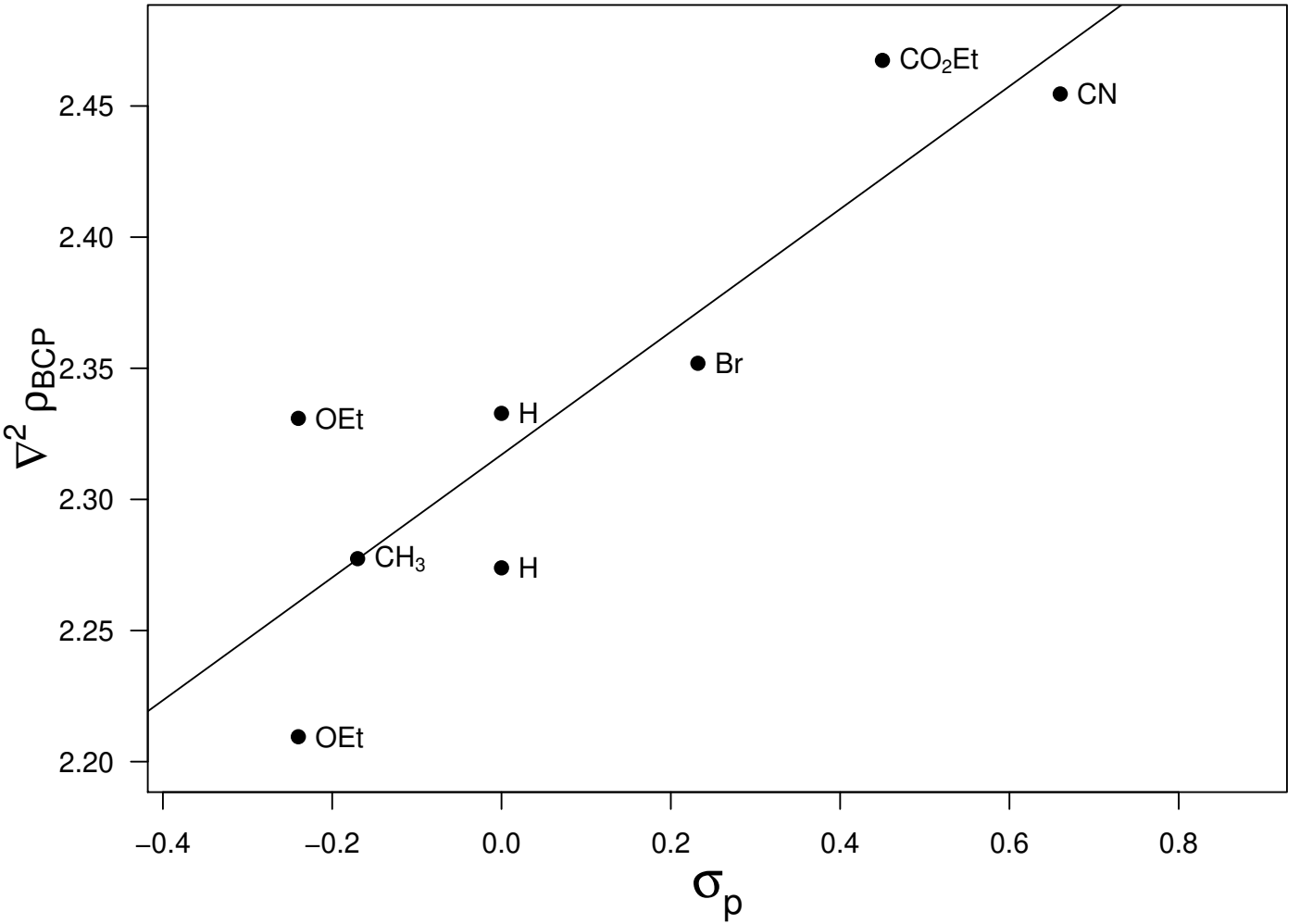

CN
NO2
OMe
OMe
CN
CO2Et
CN
Br
CF3
OMe
OEt
H
OMe
CH3
OEt
0.45
0.40
0.35
0.30
0.25
ρBCP
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8
σp

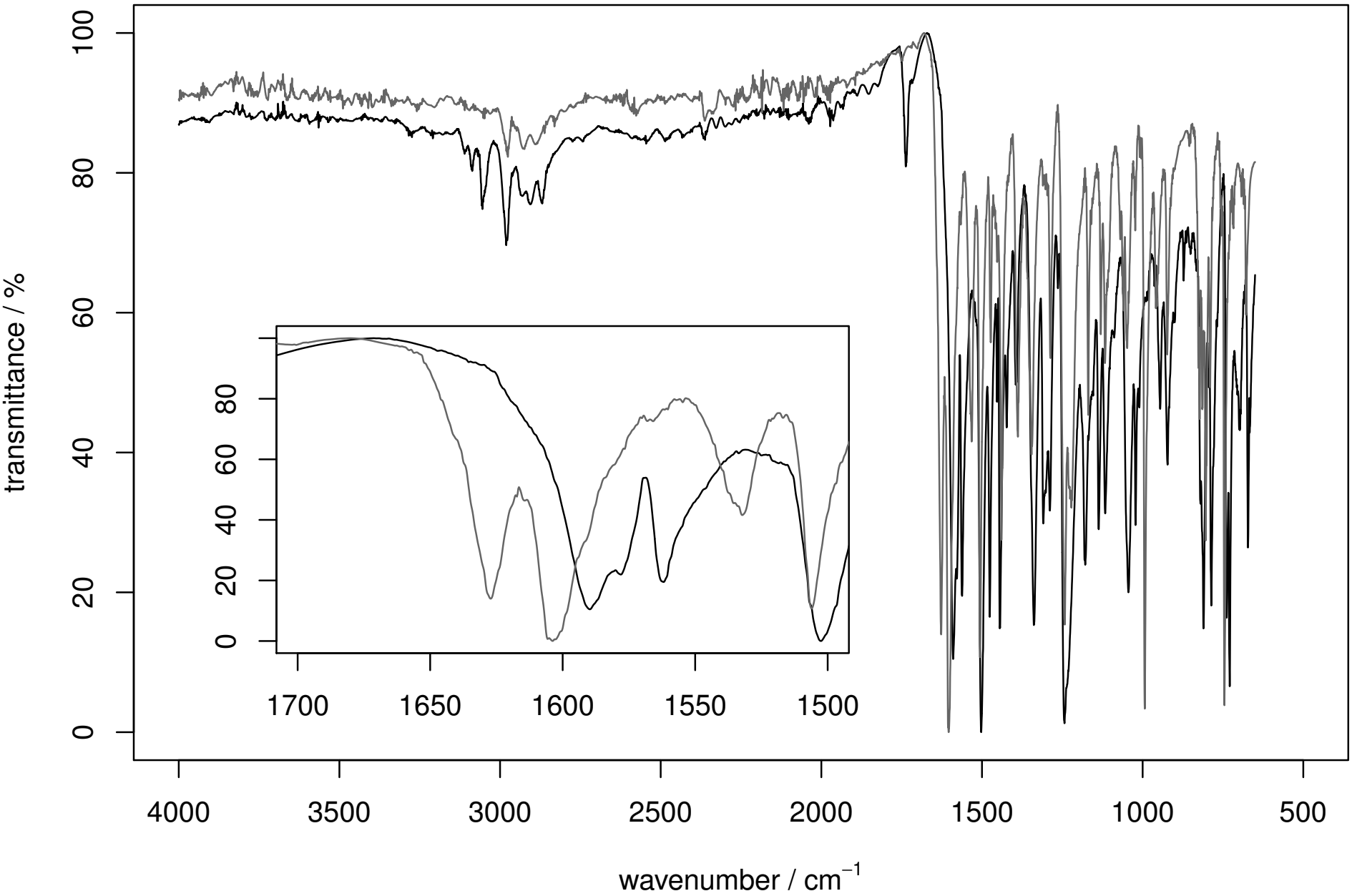

NO2
CH3
OMe
Br
OMe
OEt
H
OMe
CO2Et
CF3
CN
CN
CN
OEt
OMe
3.5
3.0
2.5
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8
∇2 ρBCP
σp

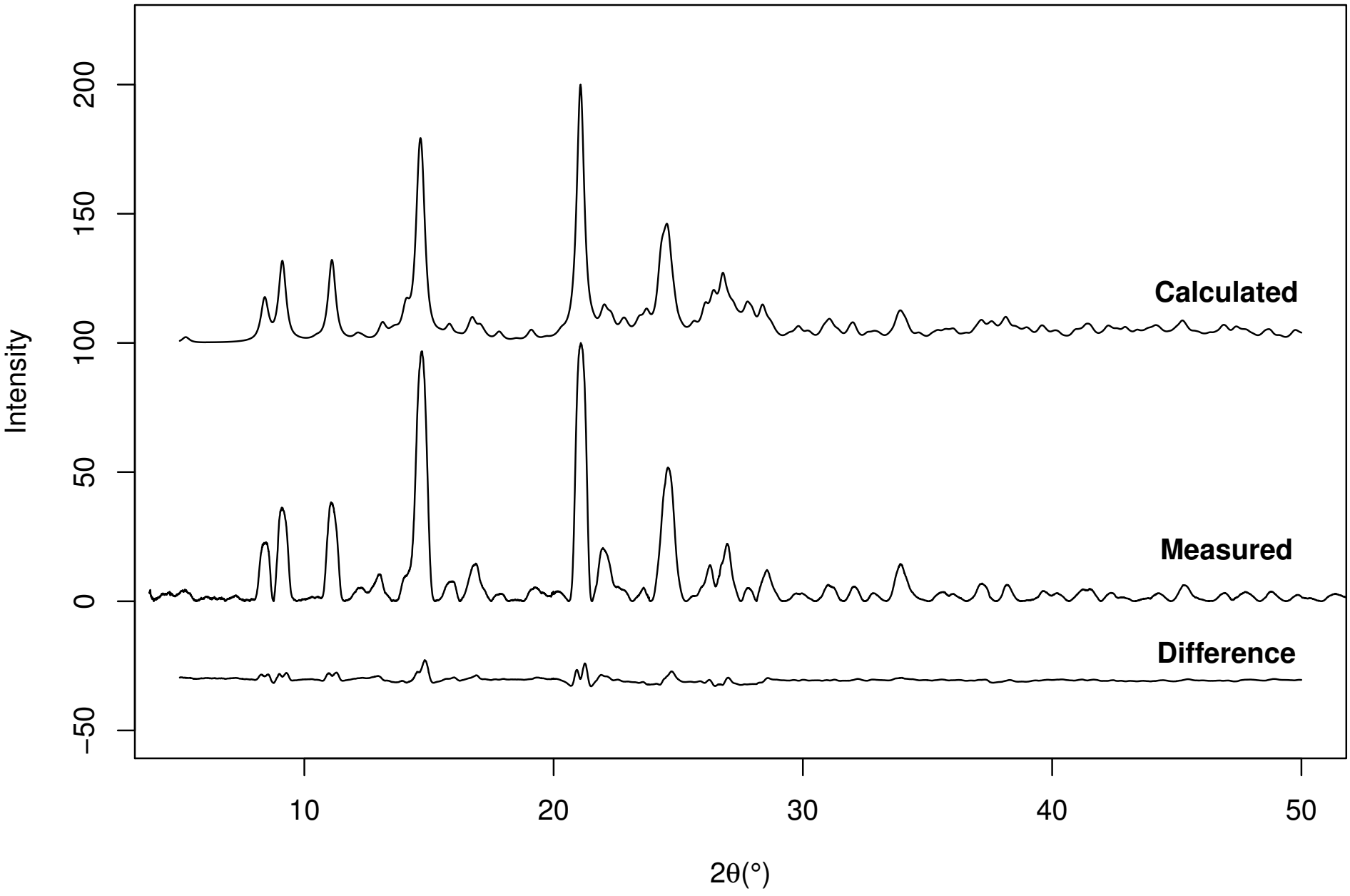

0.46
0.44
0.42
0.40
0.38
ρBCP
CH3
CN
Br
CO2Et
OEt
H
OEt
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8
σp

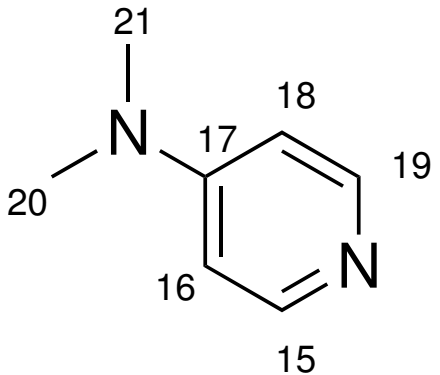

CH3
Br
CN
OEt
H
CO2Et
OEt
2.50
2.45
2.40
2.35
∇2 ρBCP
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8
σp

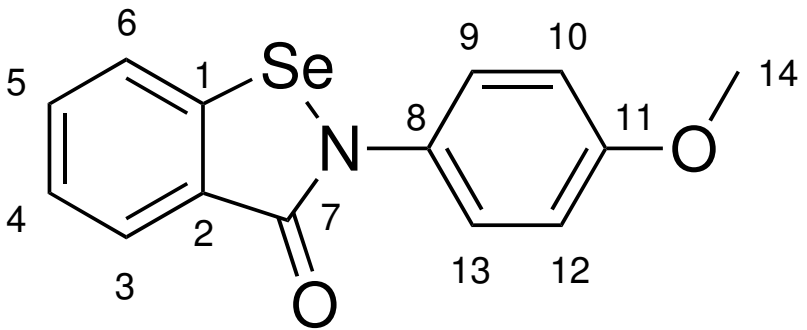

0.44
0.42
0.40
0.38
0.36
0.34
0.32
ρBCP
CO2Et
CN
Br
OEt
CH3
H
OEt
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8
σp

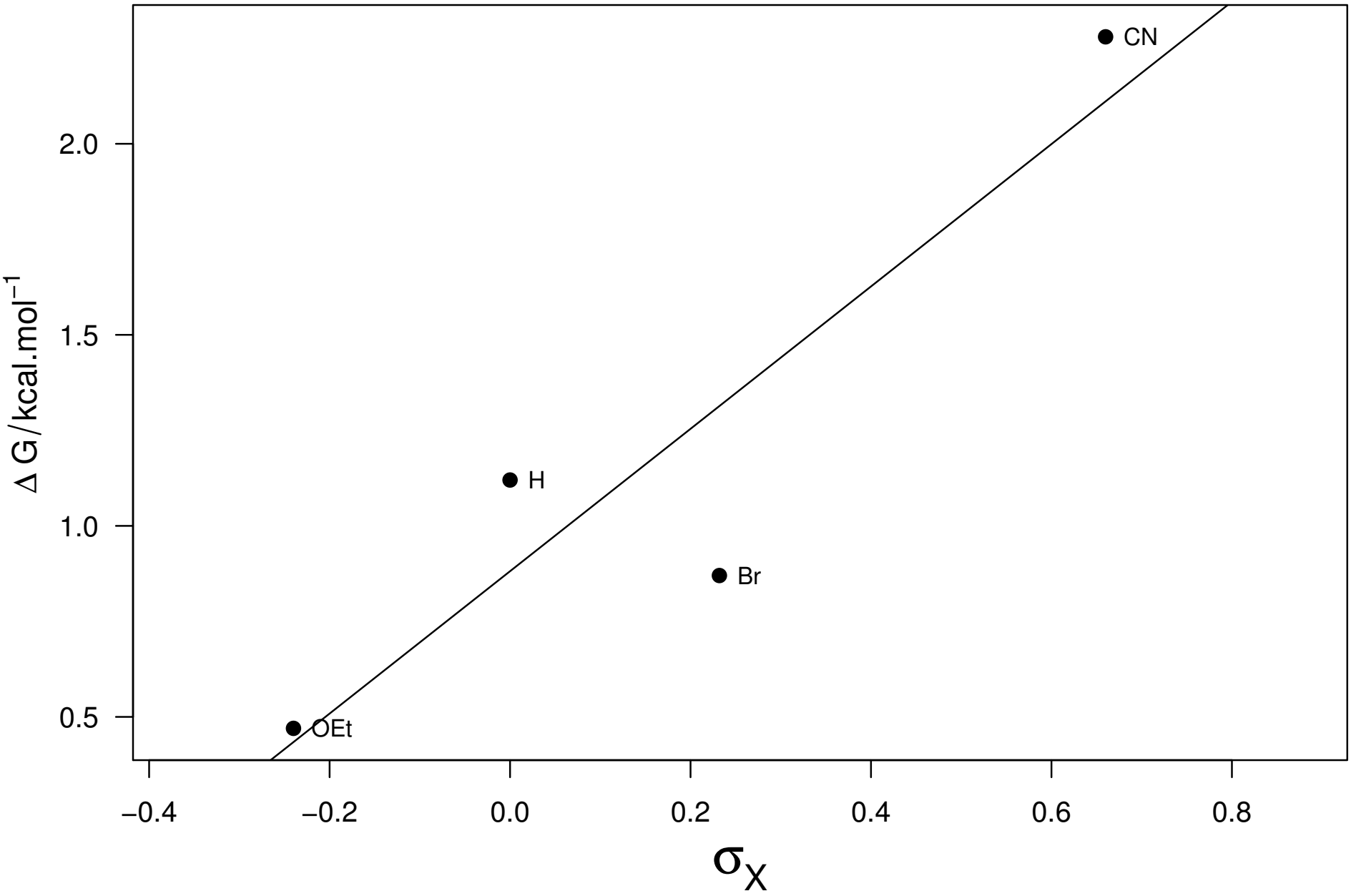

CO_2Et
CN
Br
OEt
H
CH_3
H
OEt
2.45
2.40
2.35
2.30
2.25
2.20
$\nabla^2 \rho_{BCP}$
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8
σ_p

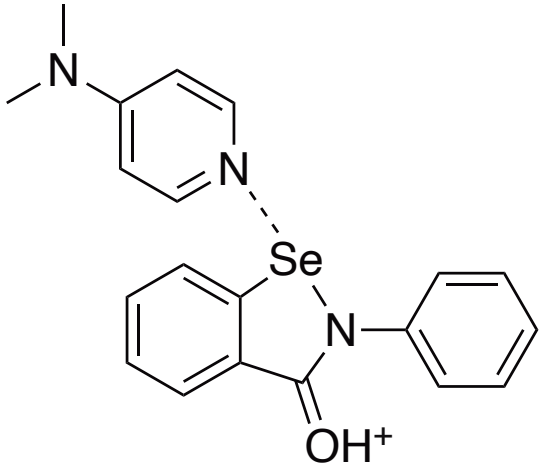

transmittance / %
0
20
40
60
80
100
4000
3500
3000
2500
2000
1500
1000
500
wavenumber / cm^{-1}
0
20
40
60
80
1700
1650
1600
1550
1500


Intensity
200
150
100
50
0
−50
Calculated
Measured
Difference
10
20
30
40
50
2θ(°)


21
18
N
17
19
20
N
16
15

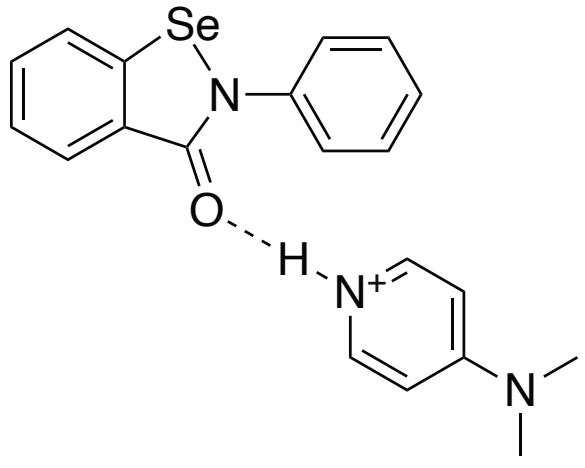

6
9
10
14
5
1
Se
8
11
N
O
4
2
7
3
13
12
O


CN
H
Br
OEt
2.0
1.5
1.0
0.5
Δ G/kcal.mol−1
−0.4
−0.2
0.0
0.2
0.4
0.6
0.8
σX



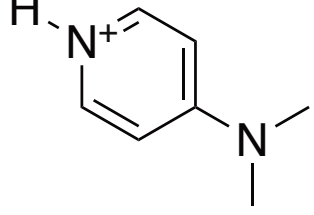
m/z: 398.08

or

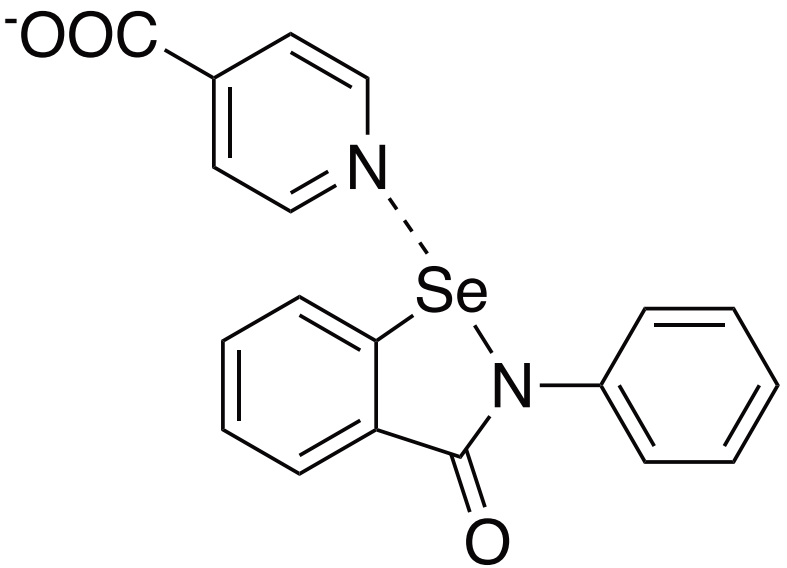


m/z: 398.08

CID

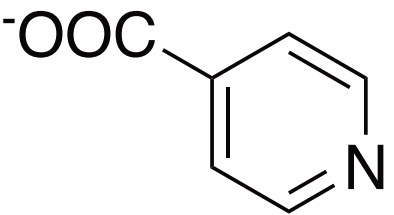


m/z: 123.09

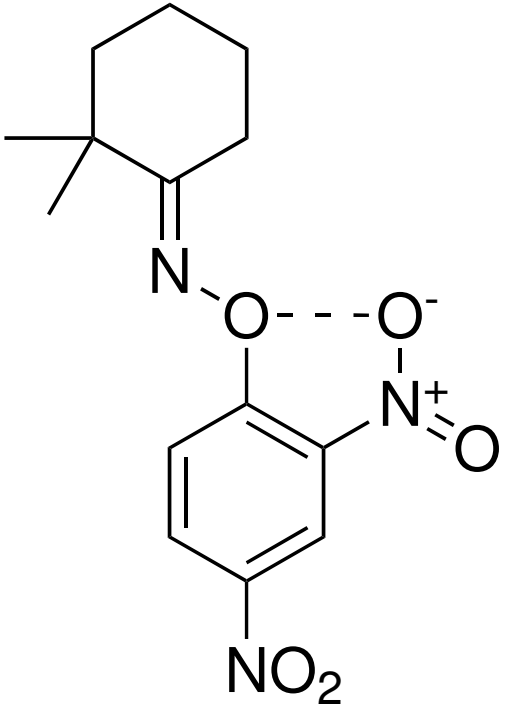


m/z: 397.01

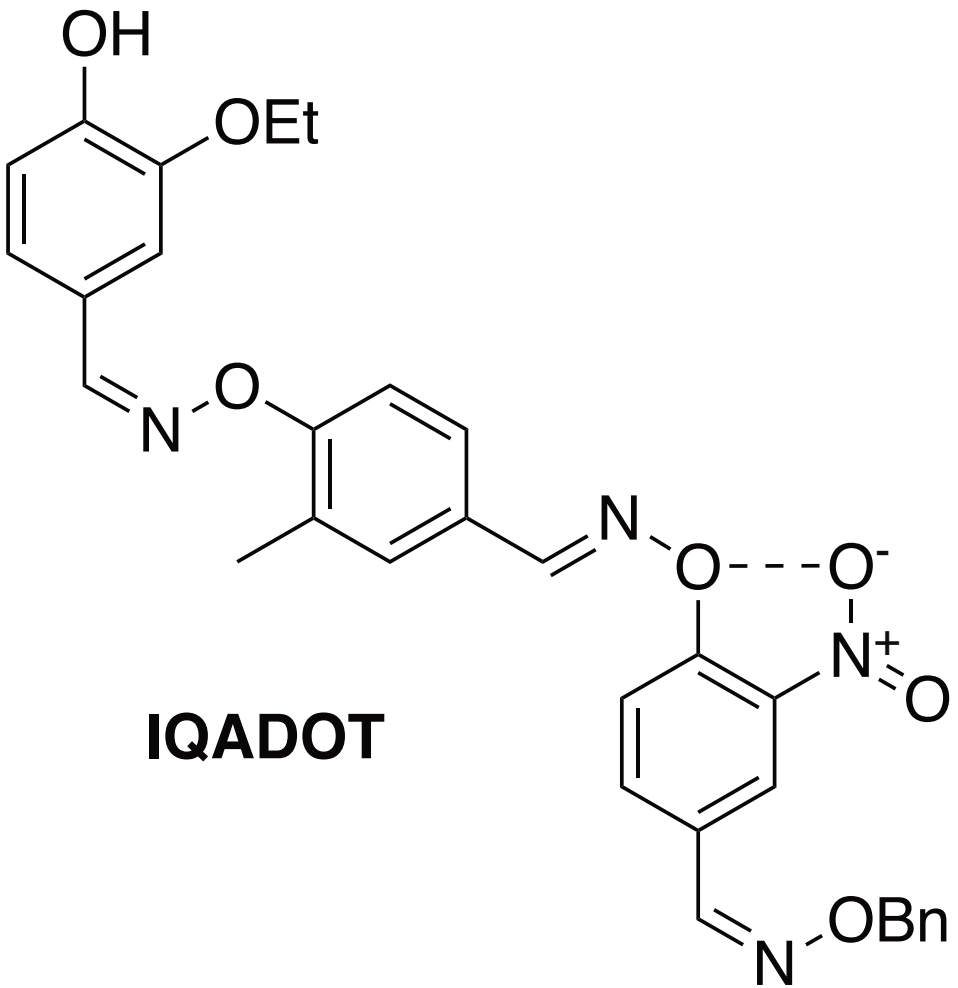
CID



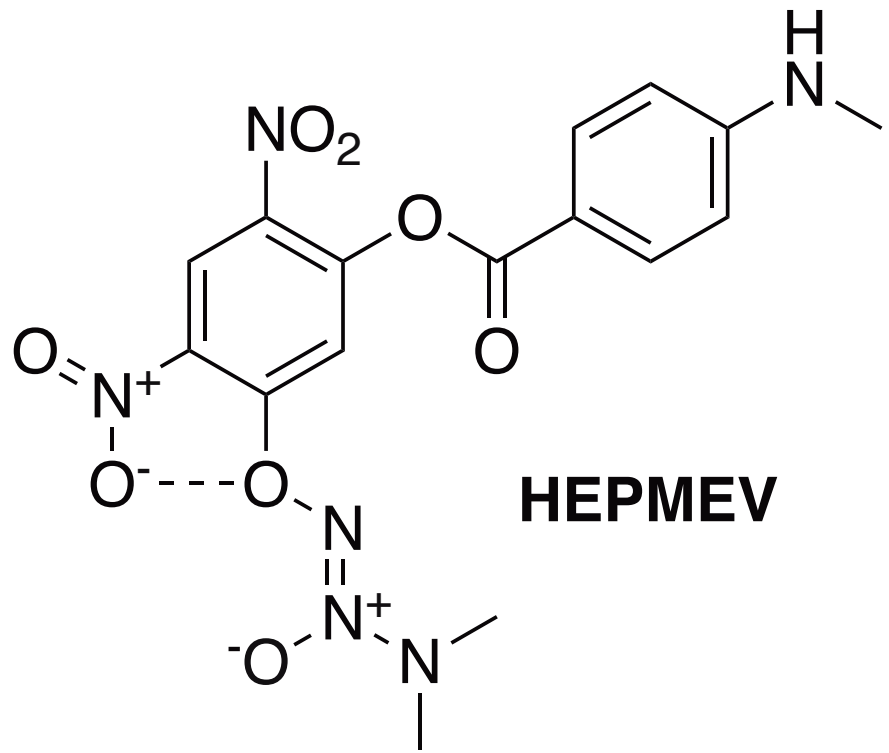
m/z: 122.02



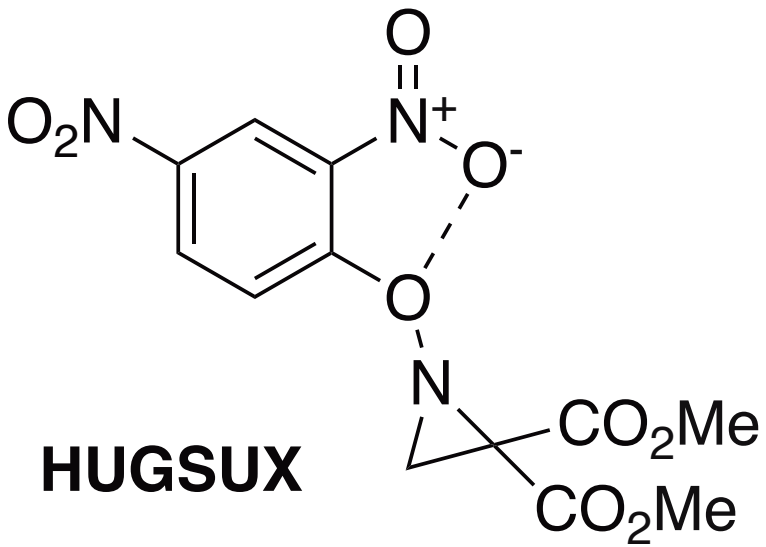
7



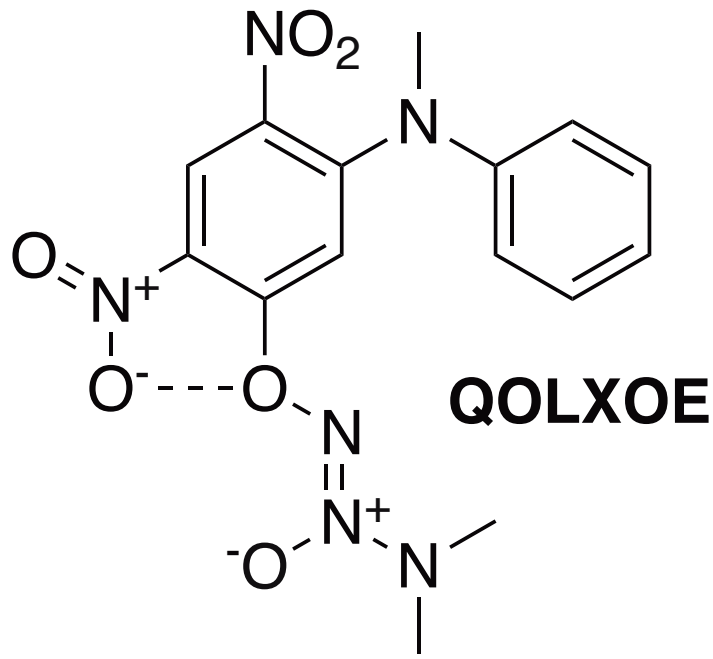
IQADOT



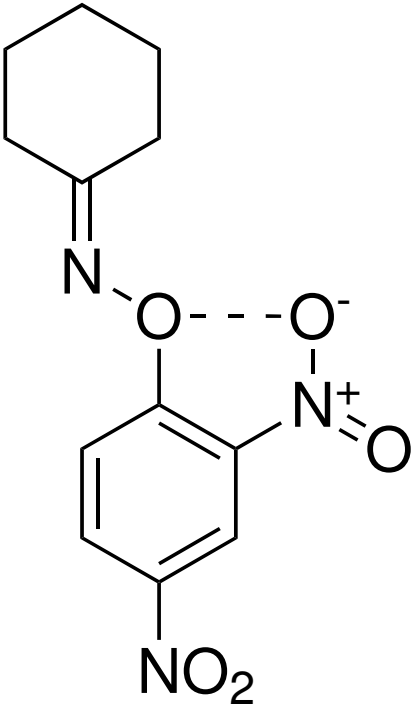
HEPMEV



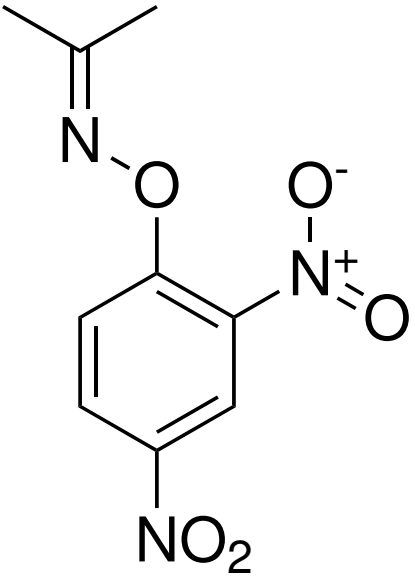
HUGSUX



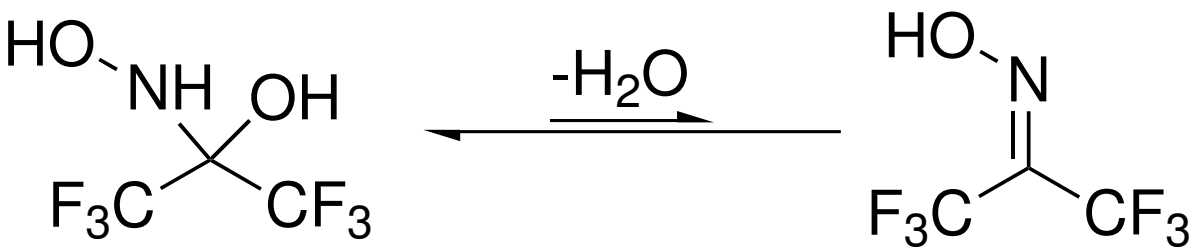
QOLXOE

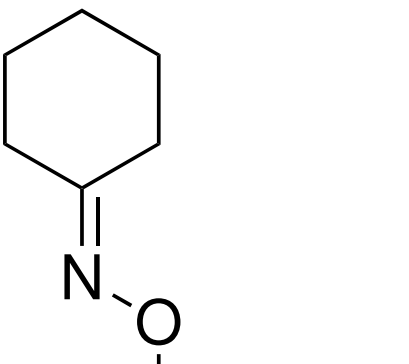


8

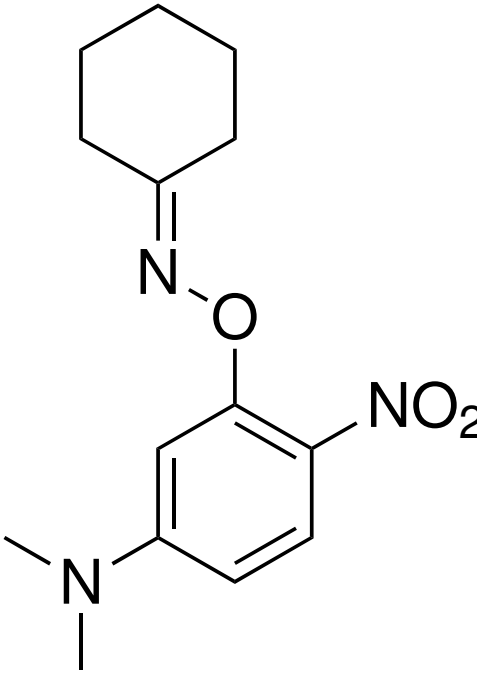


9

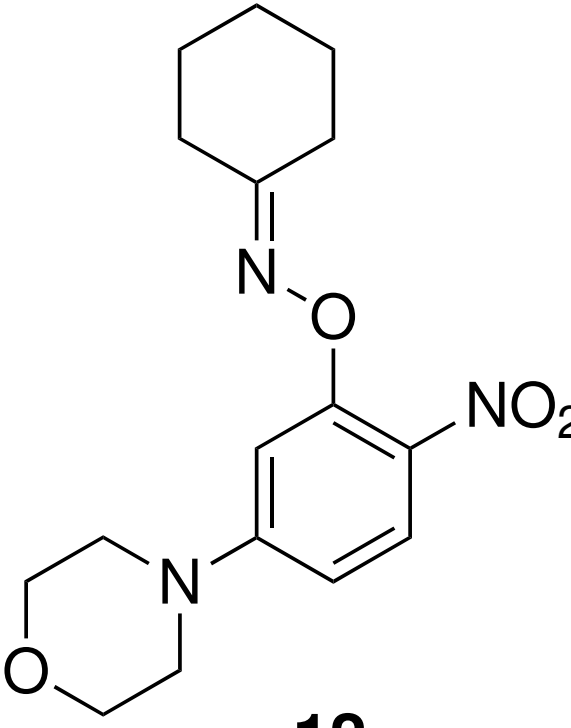

HO
NH
OH
F3C
CF3
-H2O
HO
N
F3C
CF3



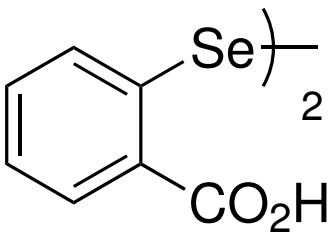
10



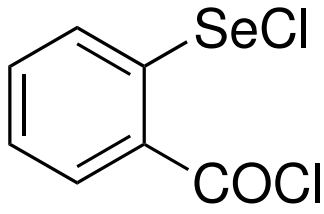
11



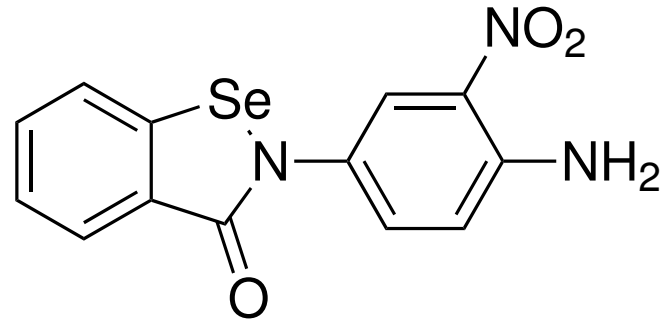
12



a

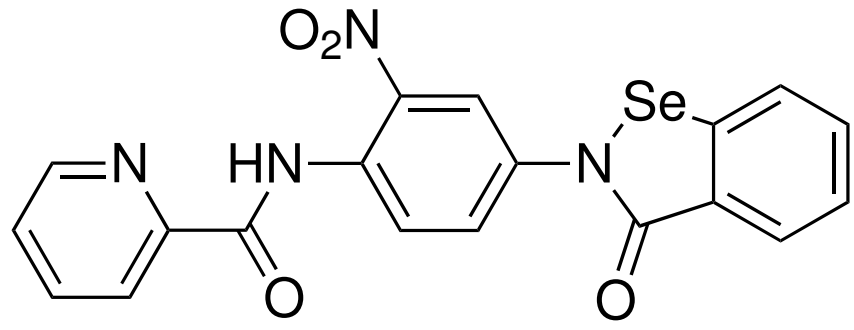


b

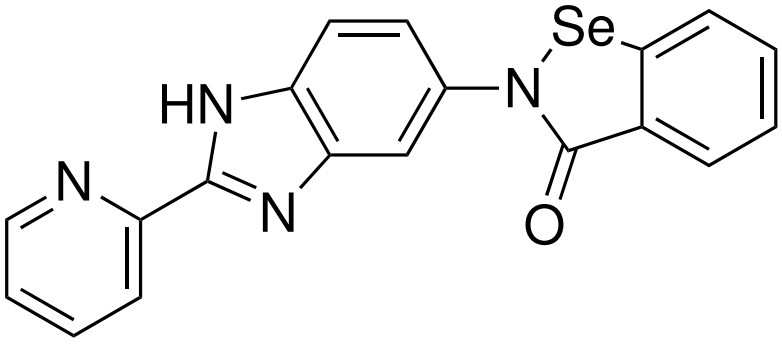


5 **6** **17**

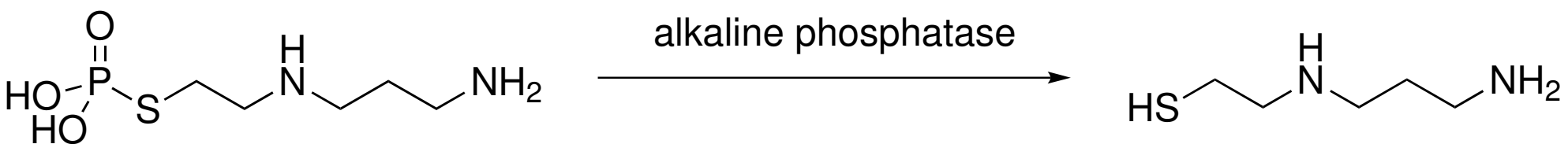
c

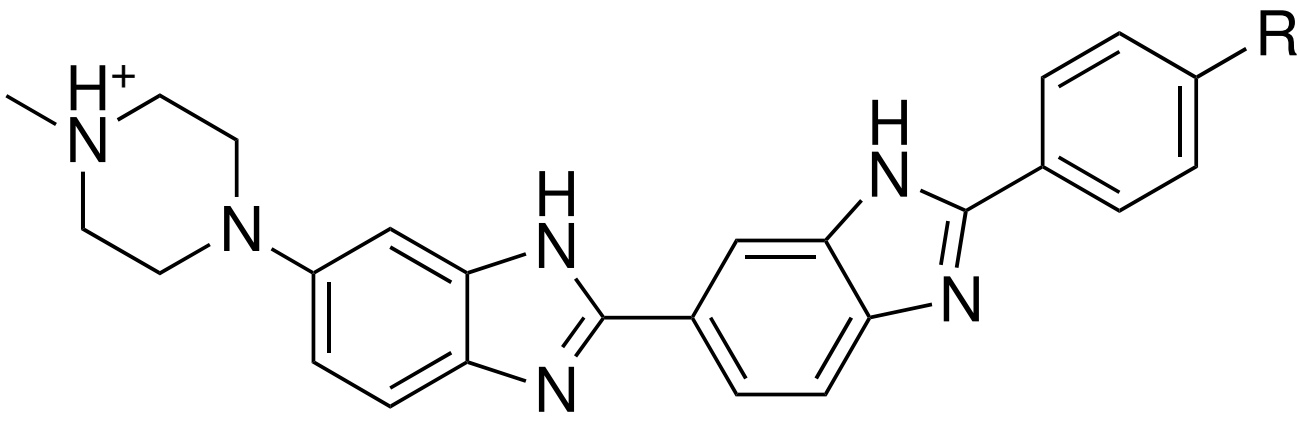


d

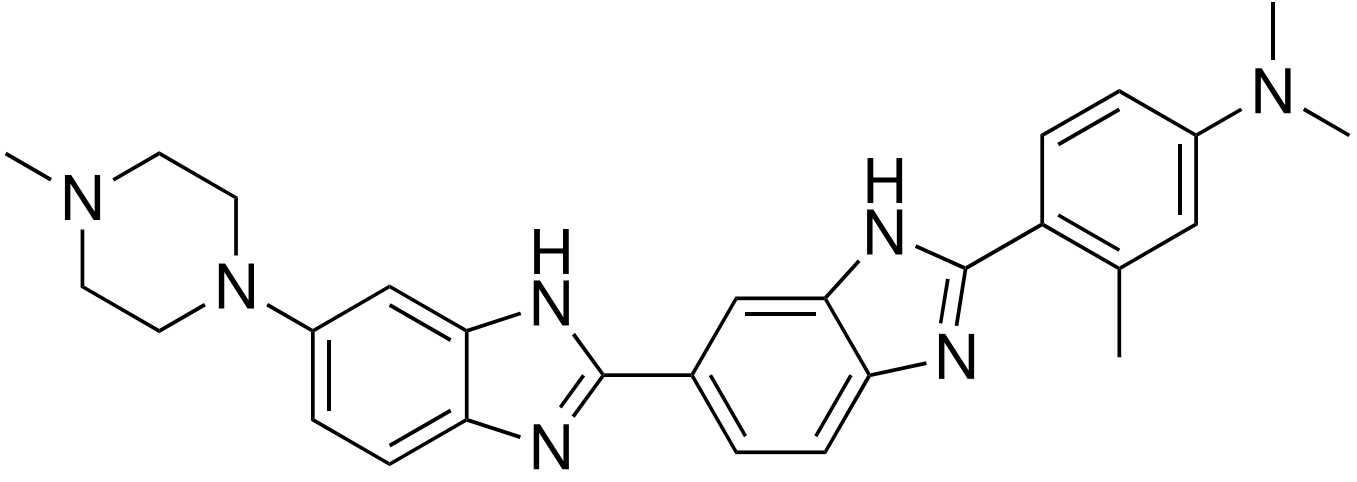


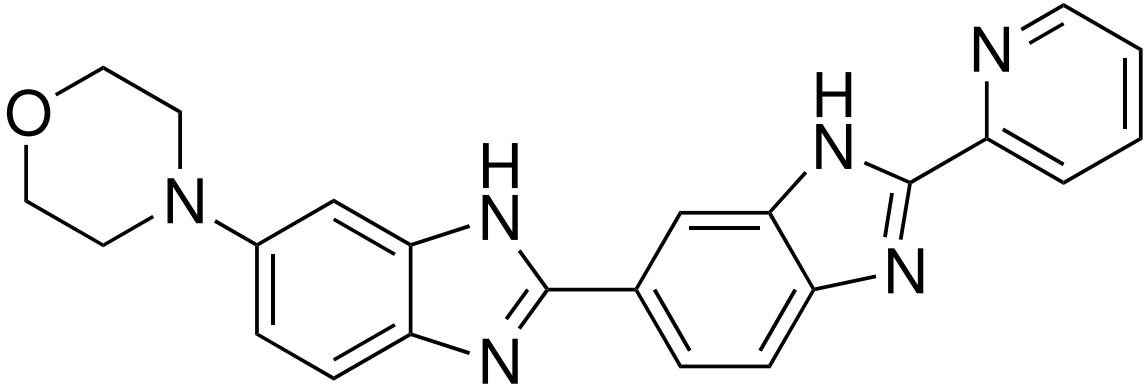
16 **14**


O
HO
P
HO
S
H
N
NH2
alkaline phosphatase
HS
H
N
NH2

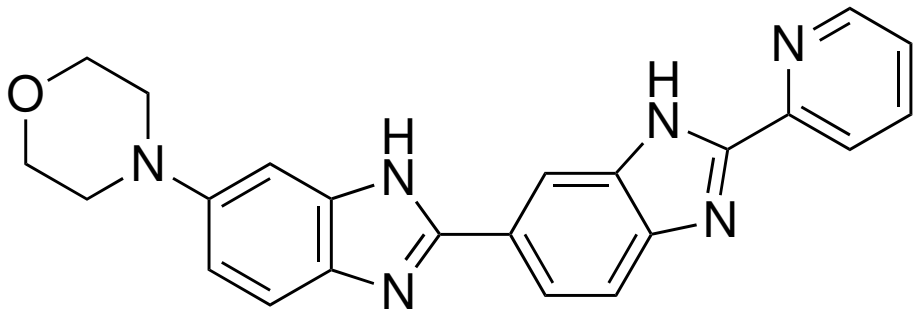


Hoechst 33258 R: OH
Hoechst 33342 R: OCH_2CH_3
Hoechst 34580 R: $N(CH_3)_2$

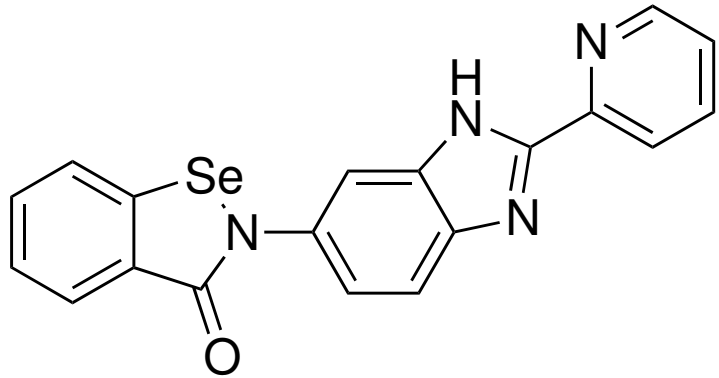




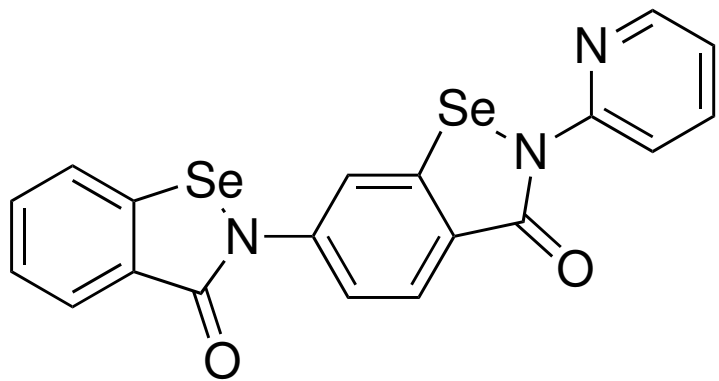
13



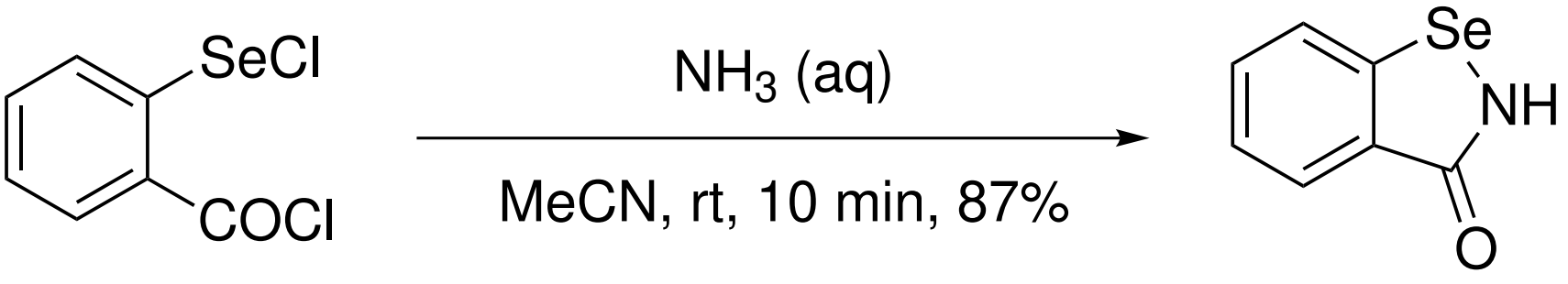
13



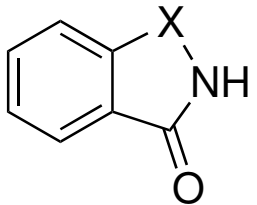
14



15

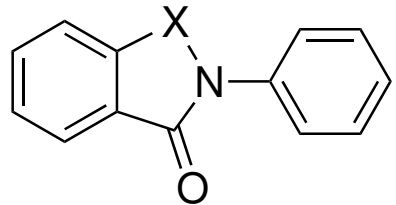


6 **1b**



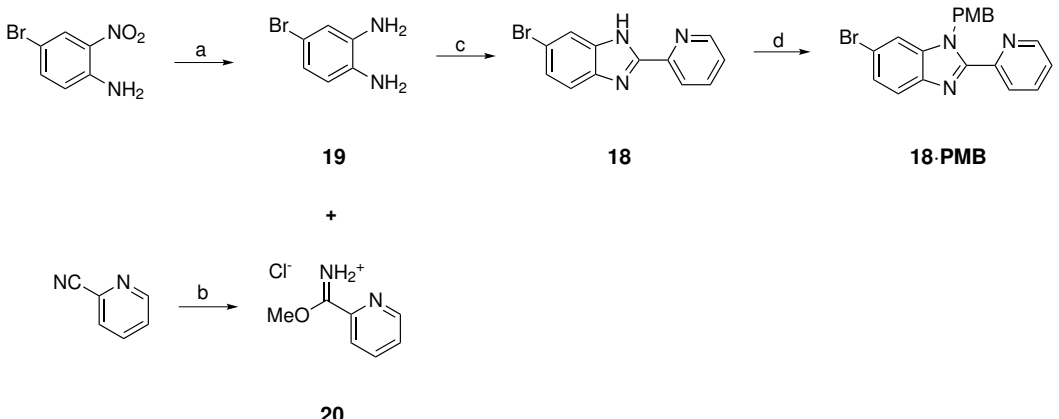
PhBr, CuI, DMEDA, K_2CO_3

4Å sieves, 1,4-dioxane , 120ºC, 18 h, 45%

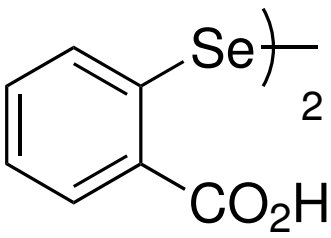


X = S, Se

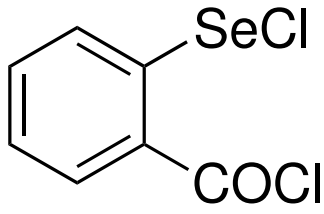
1b **1**


Br
NO2
NH2
a
Br
NH2
NH2
c
Br
H
N
N
d
Br
PMB
N
N
19
18
18·PMB
+
NC
N
b
Cl-
NH2+
MeO
N
20

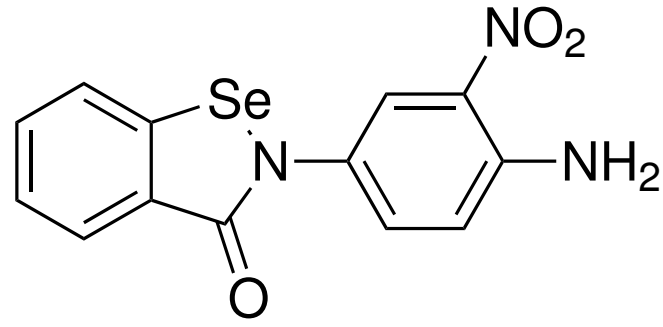
PMB
Br
N
N
21·PMB
X
NH
O
CuI, DMEDA, K_2CO_3
4Å sieves, 1,4-dioxane , 120ºC, 24 h, 48%
PMB
N
X
N
N
O
X = S, Se
1b
22·PMB



a

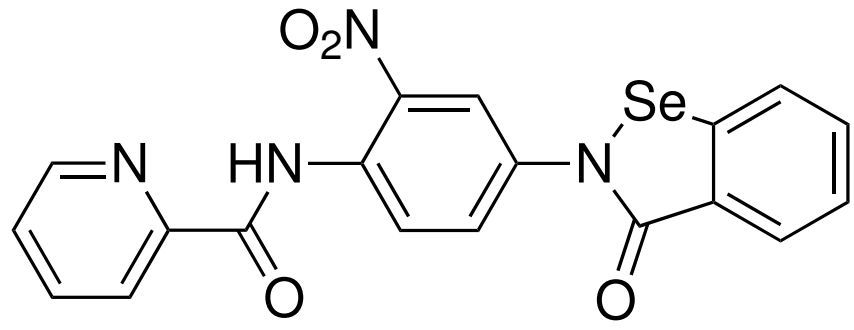


b

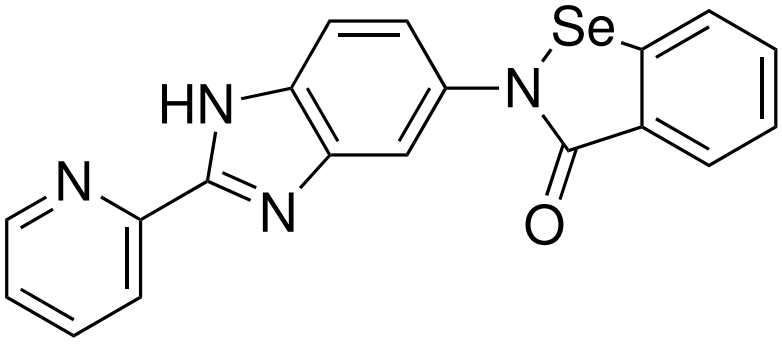


5 **6** **17**

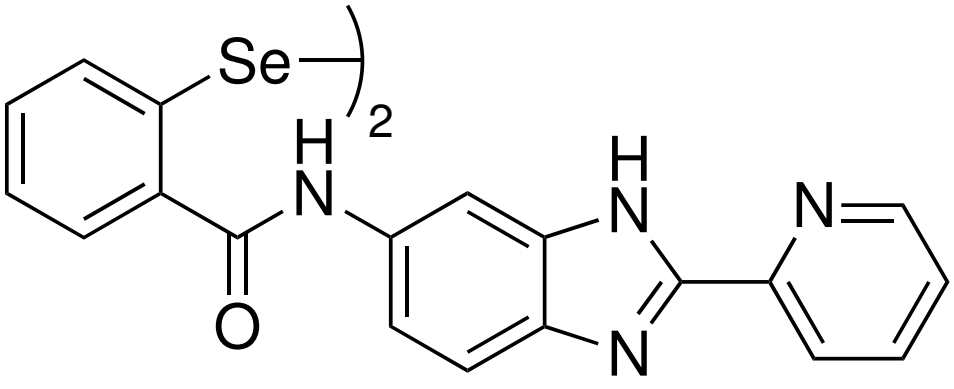
c



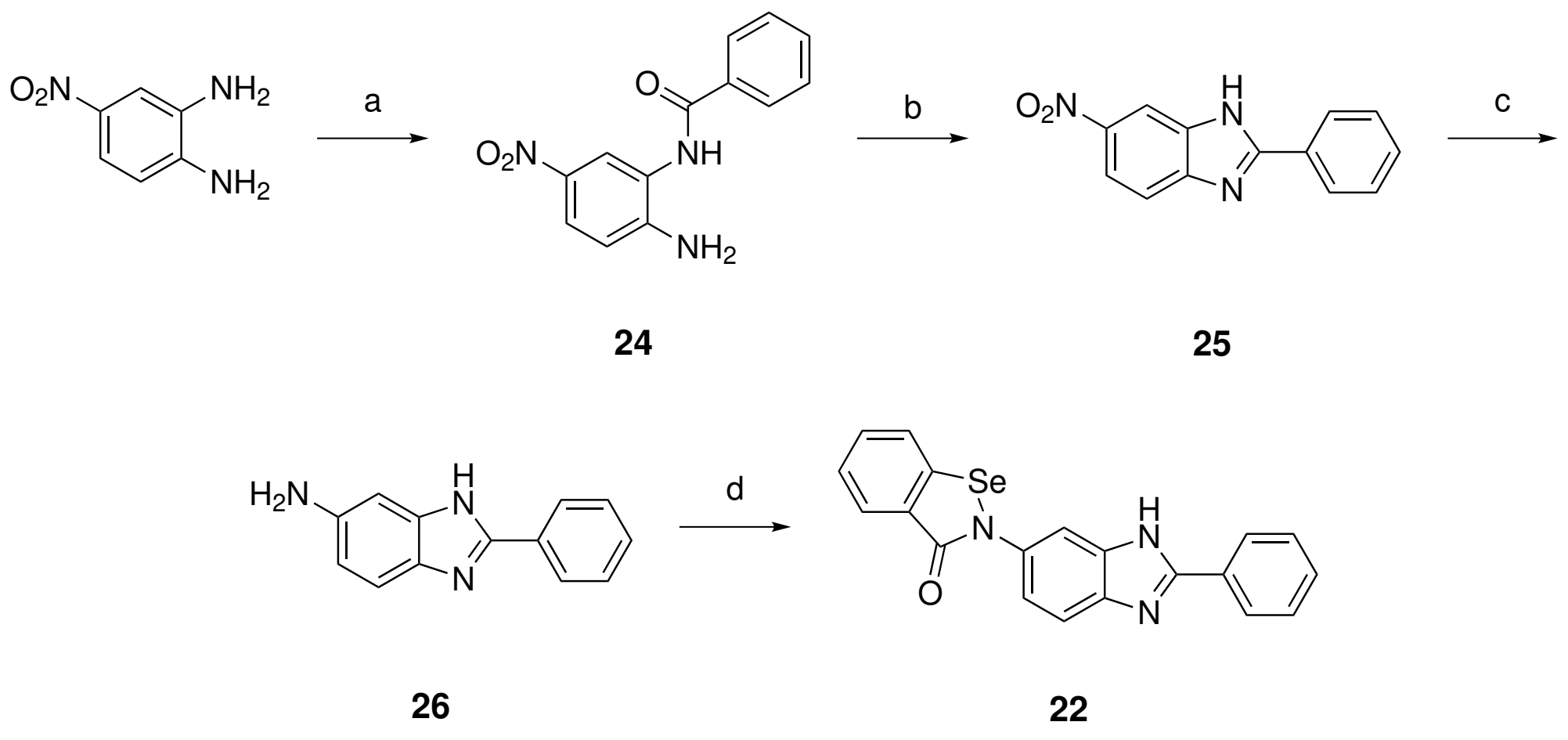
d

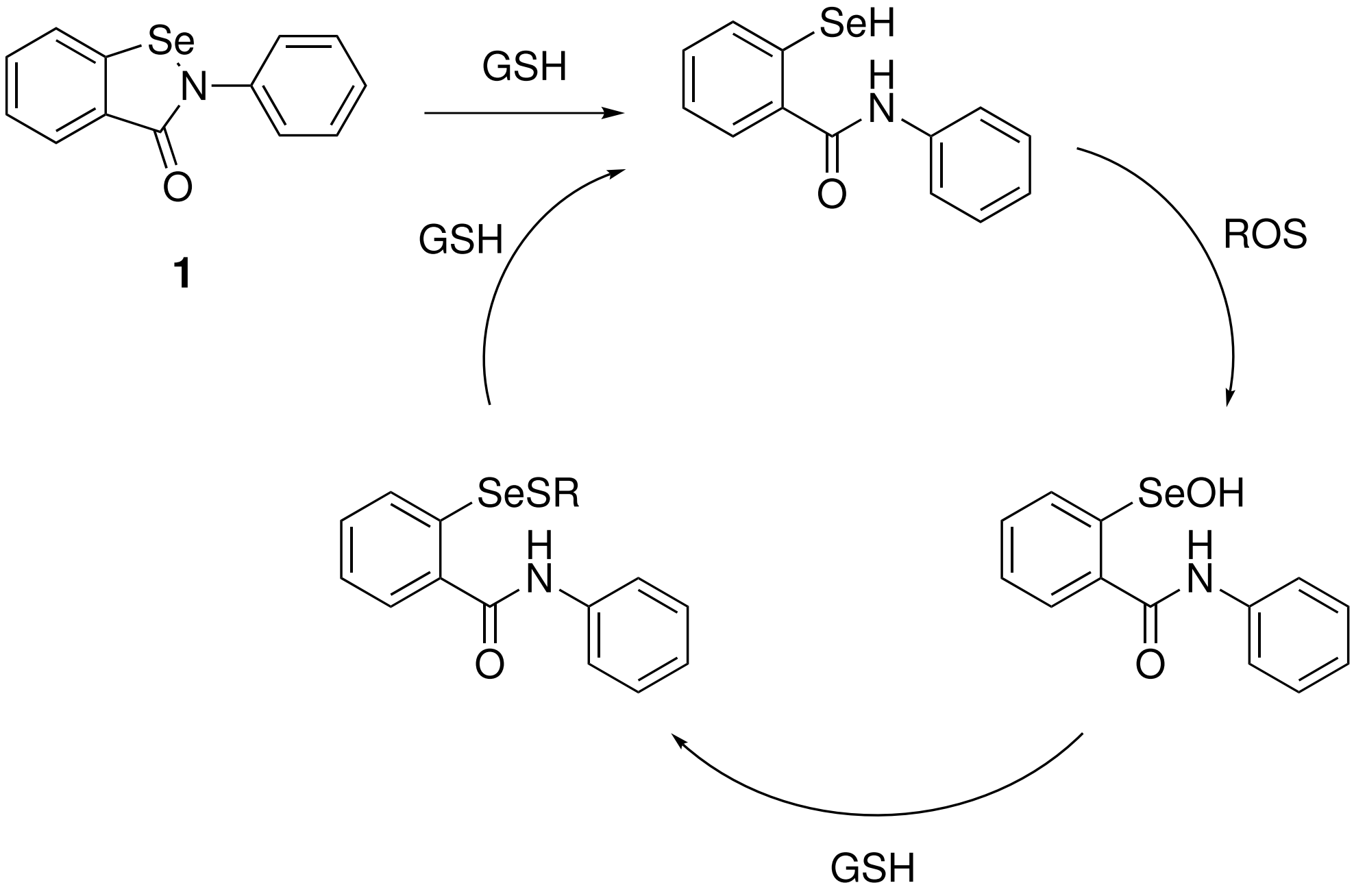


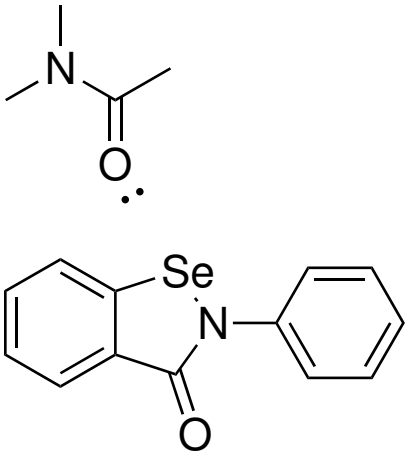
16 **14**



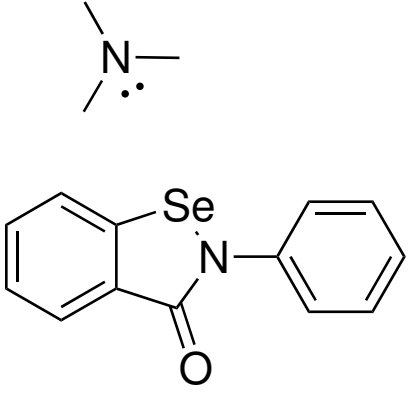
23


O2N
NH2
NH2
a
O
NH
O2N
NH2
24
b
O2N
H
N
N
25
c
H2N
H
N
N
26
d
Se
N
O
H
N
N
22

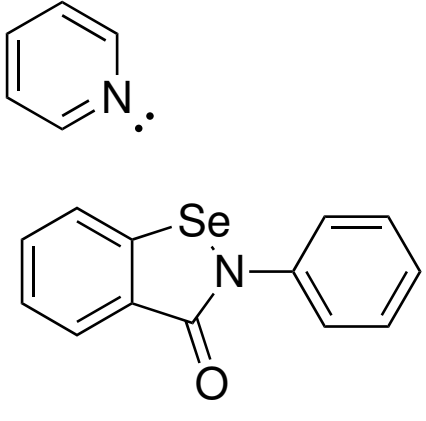

Se
N
O
1
GSH
SeH
H
N
O
ROS
SeOH
H
N
O
GSH
SeSR
H
N
O
GSH



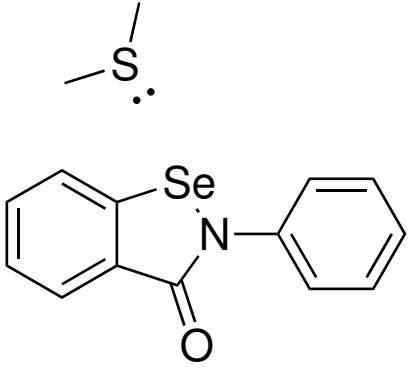
1•DMAc



1•TMA



1•py



1•DMS