

Electronic supplementary information

**Organic Linker Geometry Controlled Synthesis of Coordination
Polymer Spheres and Their Thermal Transformation to Yolk-
Shell Metal Oxides**

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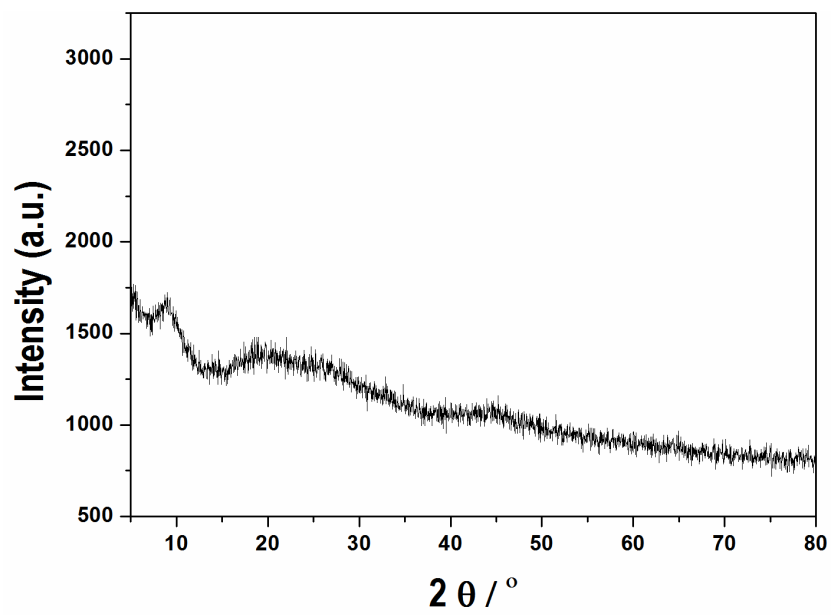


Fig. S1 XRD pattern of Eu-CPs.

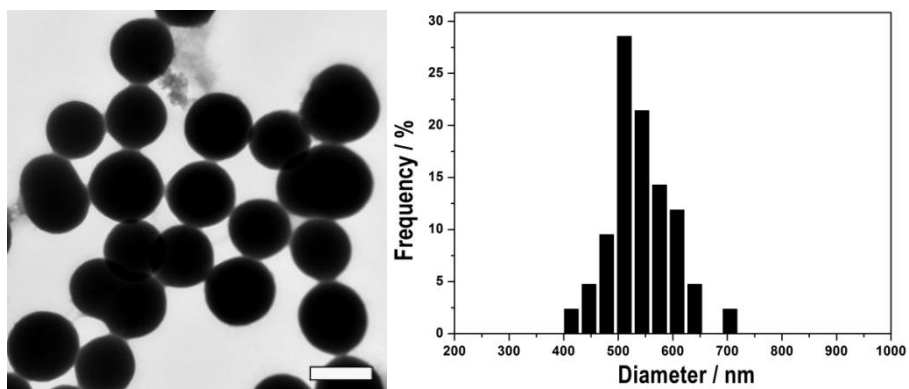


Fig. S2 TEM image and size-distribution diagram of Eu-CPs prepared under 15 mM precursor concentration at 160 °C for 10 min. Scale bar: 500 nm.

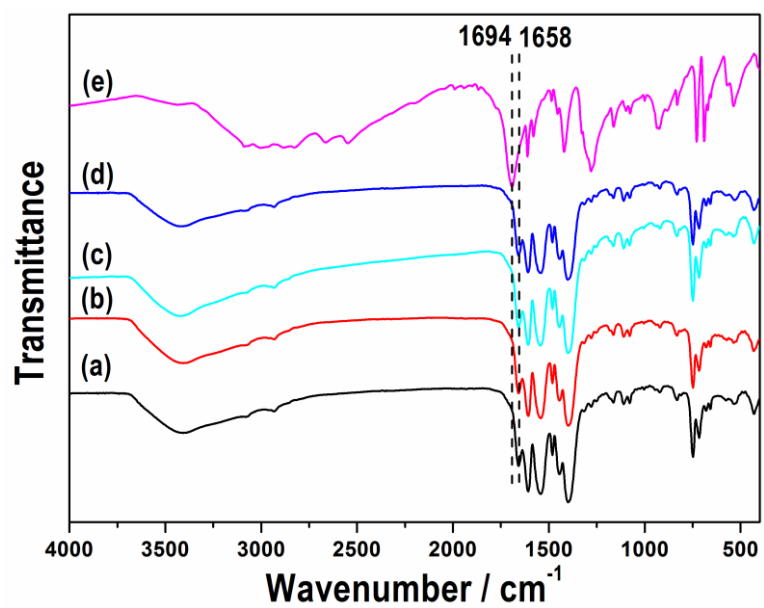


Fig. S3 FT-IR spectra of the Eu-CPs prepared with different precursor concentrations (a) 2.5 mM, (b) 5 mM, (c) 10 mM and (d) 15 mM. (e) 1,3-Benzenedicarboxylic acid (L5).

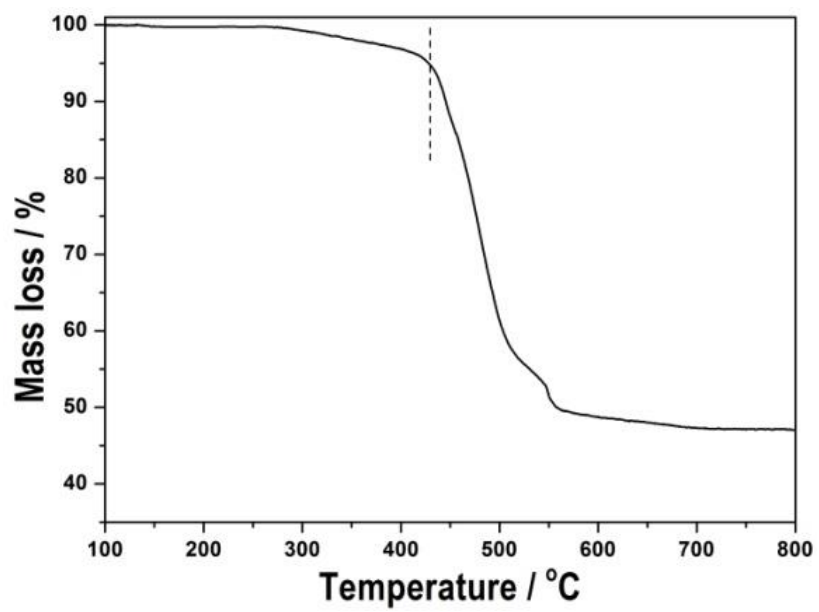


Fig. S4 TGA curve of the Eu-CPs.

Table S1 The preparation conditions of the M-CPs.

Sample	M / mM	Linker / mM	T / °C	t / min	Diameter / nm
Ni-CPs	10	10	140	360	303
Zn-CPs	10	10	140	30	1366
Mg-CPs	5	5	160	360	55
In-CPs	10	10	140	30	155
Y-CPs	2.5	2.5	160	30	374
Sm-CPs	2.5	2.5	160	30	342
Gd-CPs	2.5	2.5	160	30	134
Ho-CPs	2.5	2.5	160	30	300
Er -CPs	2.5	2.5	160	30	417
Yb-CPs	5	5	160	30	250
Lu-CPs	2.5	2.5	160	30	370
EuGd-CPs (6:4)	5	5	160	30	261
EuGd-CPs (4:6)	5	5	160	30	243
EuYb-CPs	5	5	160	30	256
EuYYb-CPs	7.5	7.5	160	30	300
YEuErLu-CPs	10	10	160	30	520

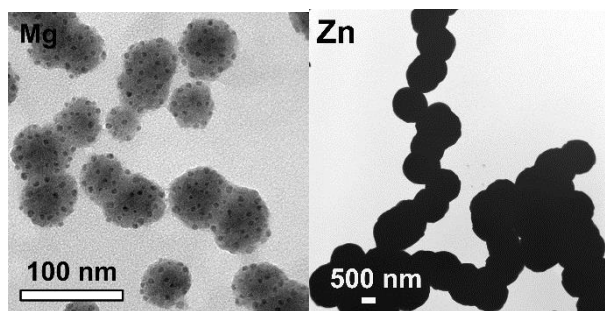
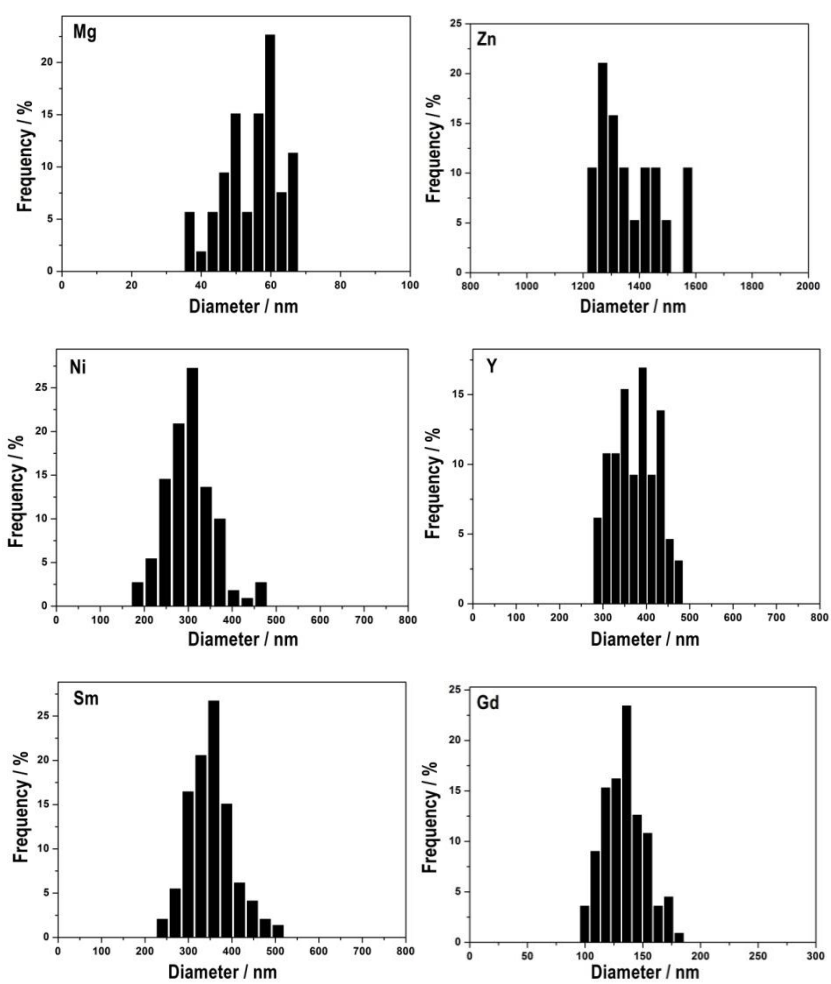


Fig. S5 TEM images of M-CPs prepared with different metal cations.



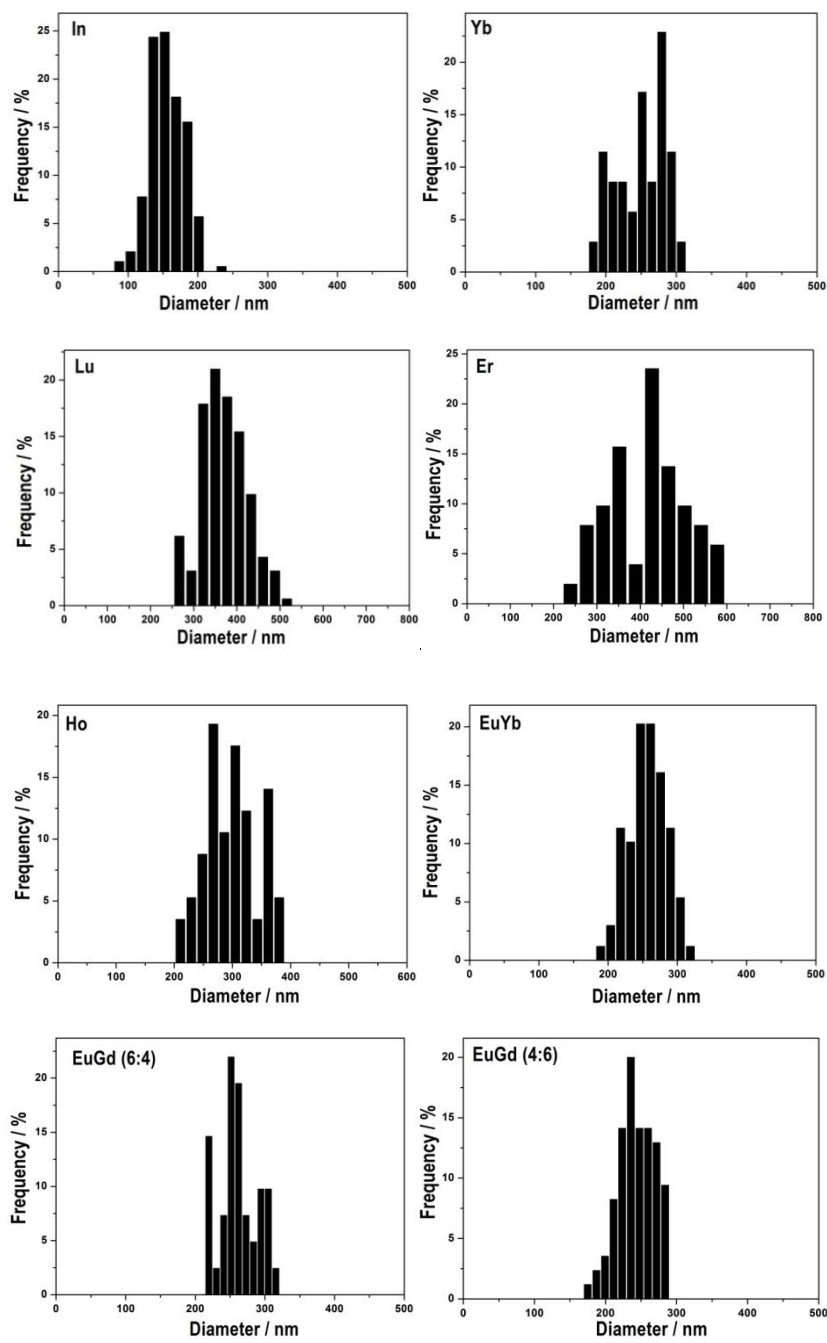


Fig. S6 Size distribution diagrams of M-CPs.

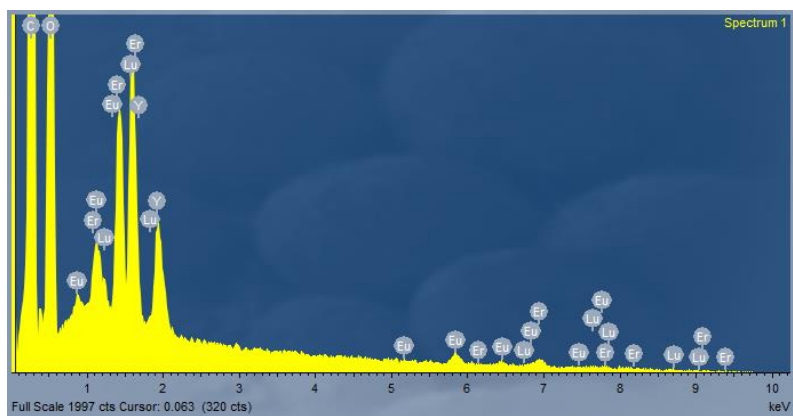


Fig. S7 EDS of YEuErLu-CPs.

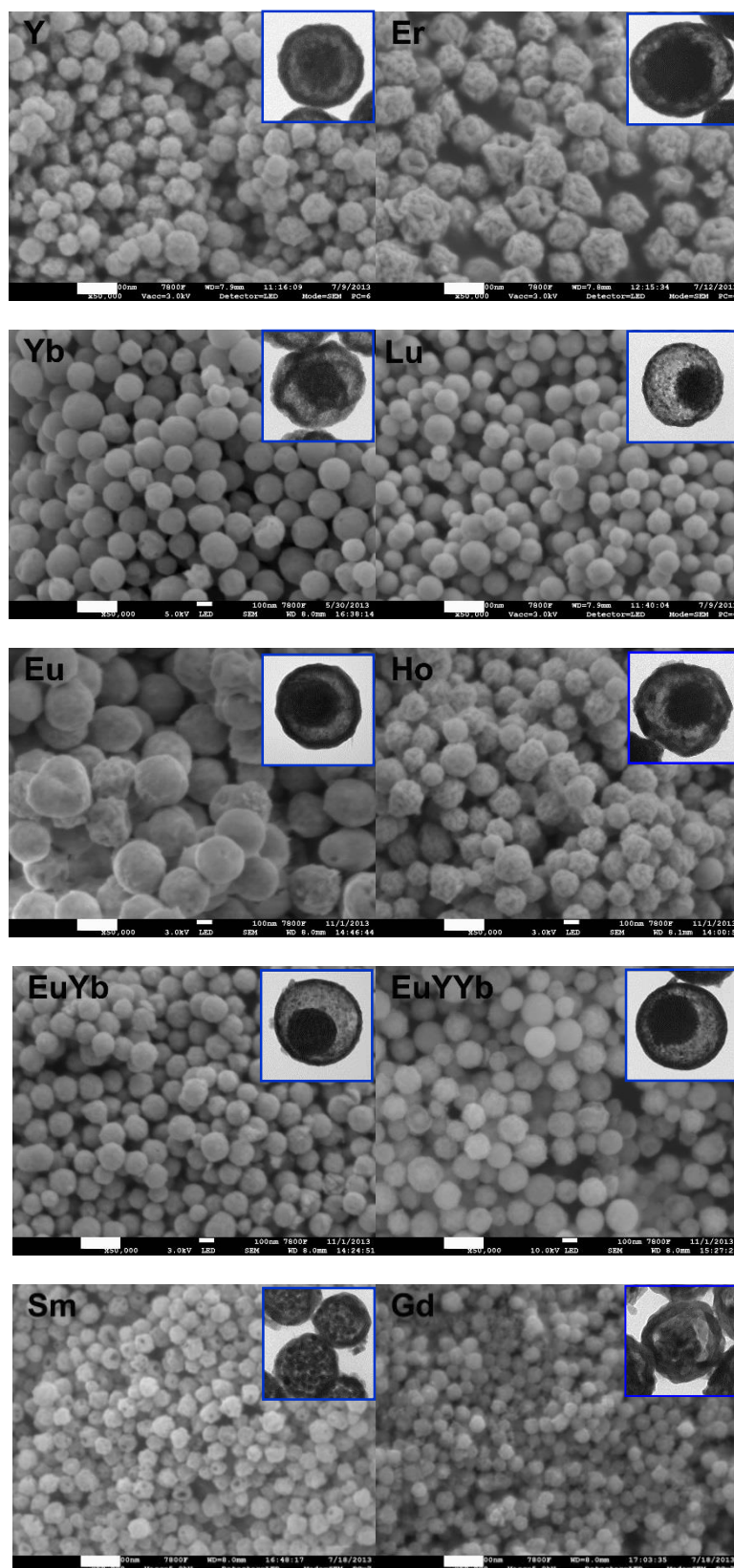


Fig. S8 SEM and TEM images of the metal oxide spheres obtained by calcination of their respective solid precursors (M-CPs) at 600 °C for 3 h. Scale bars: 200 nm.

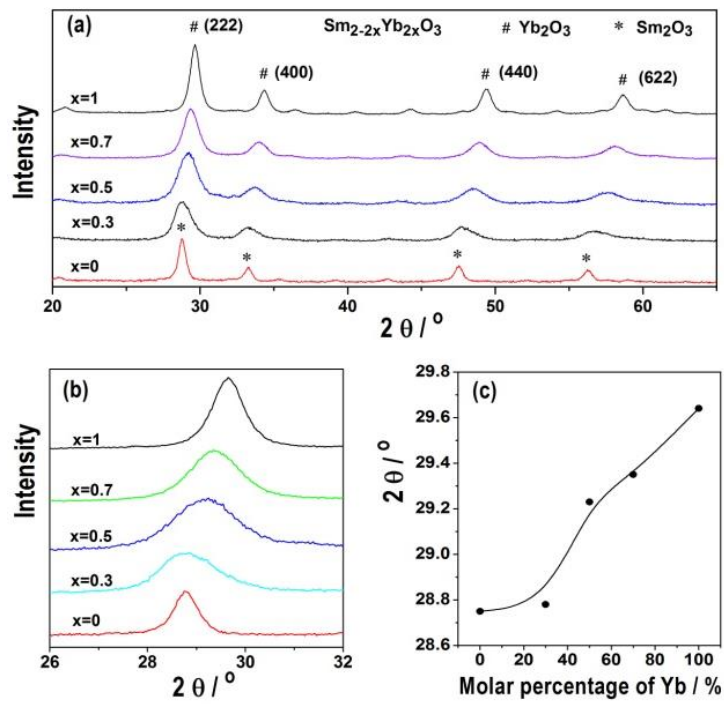


Fig. S9 XRD patterns (a, b) of SmYb-MOs with different molar percentage of Yb. (c) The changes of (222) peak degree with Yb content.

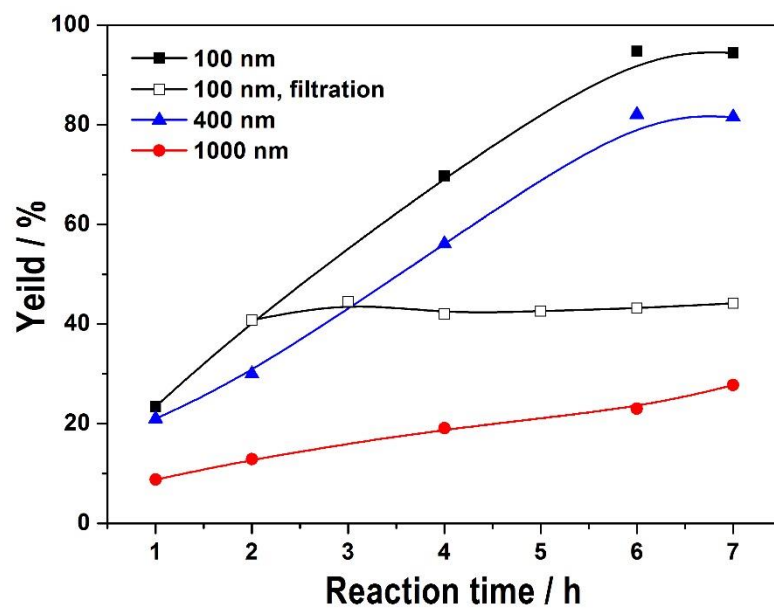


Fig. S10 Size effect of Eu-CPs on the cyanosilylation of benzaldehyde and filtration experiment. Reaction conditions: 5 mg catalyst, 0.25 mmol benzaldehyde, 0.5 mmol Me₃SiCN, 1.5 mL CH₂Cl₂, room temperature, under Ar.

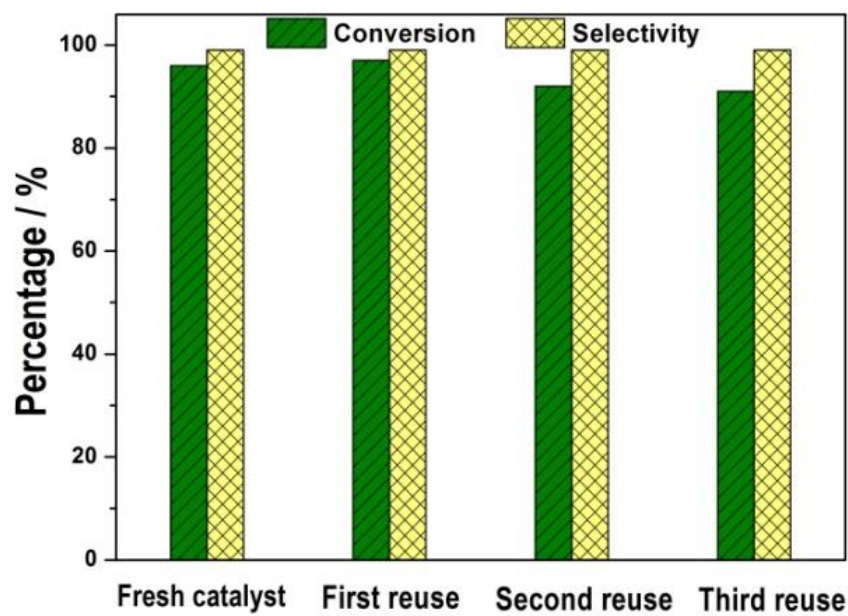


Fig. S11 Recycle of the Eu-CPs. Reaction conditions: 5 mg catalyst, 0.25 mmol benzaldehyde, 0.5 mmol Me₃SiCN, 1.5 mL CH₂Cl₂, room temperature, 6 h, under Ar.

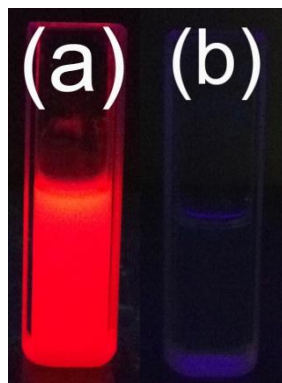
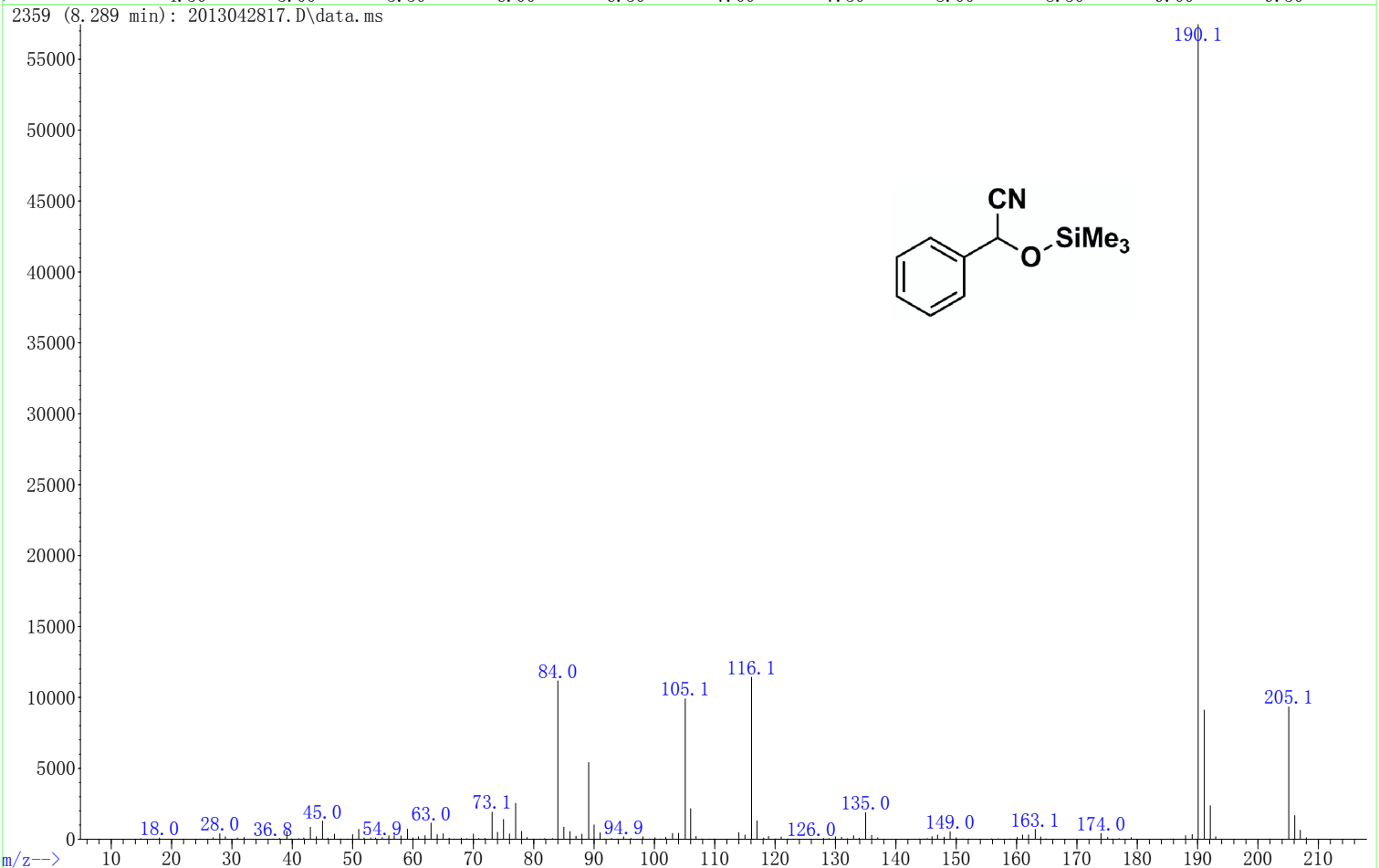
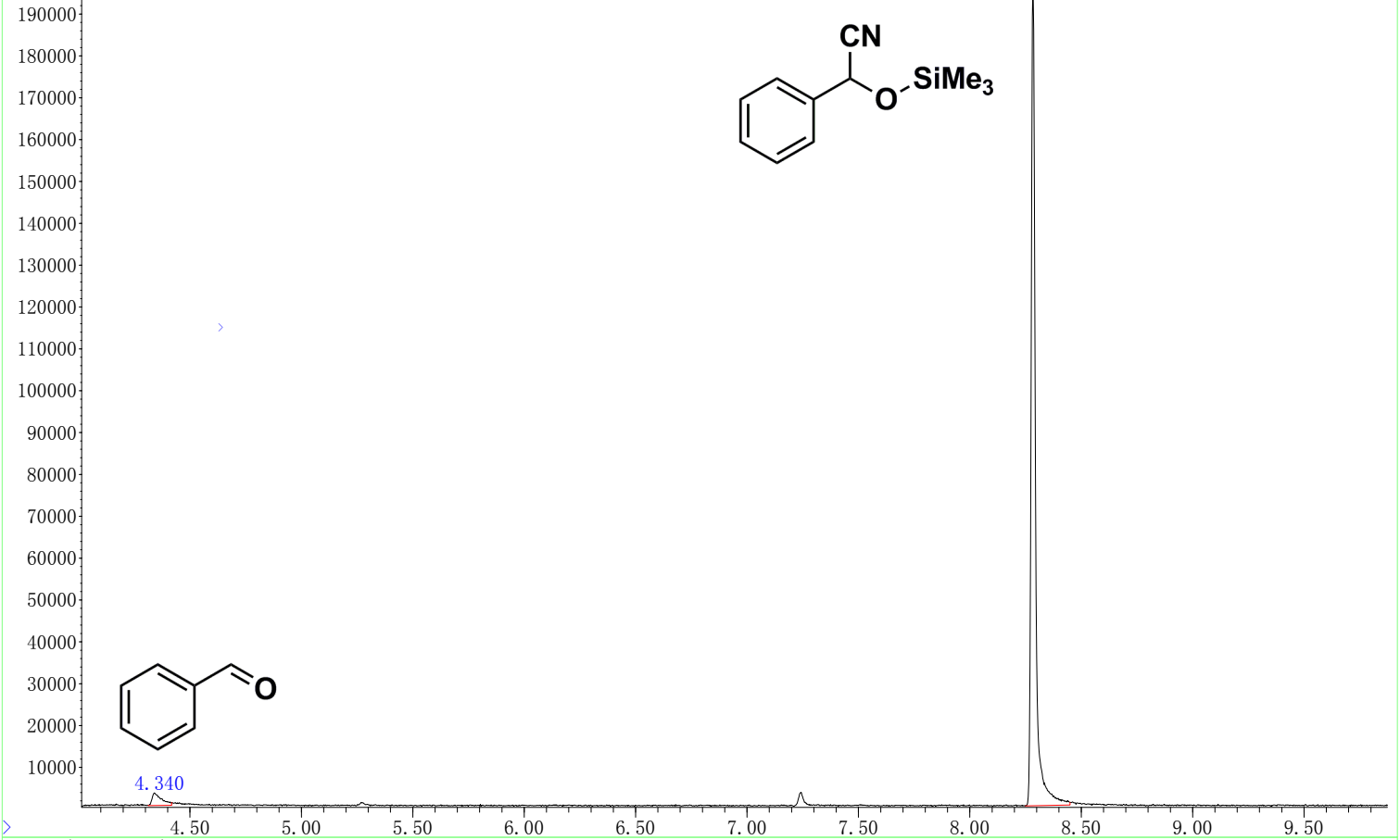
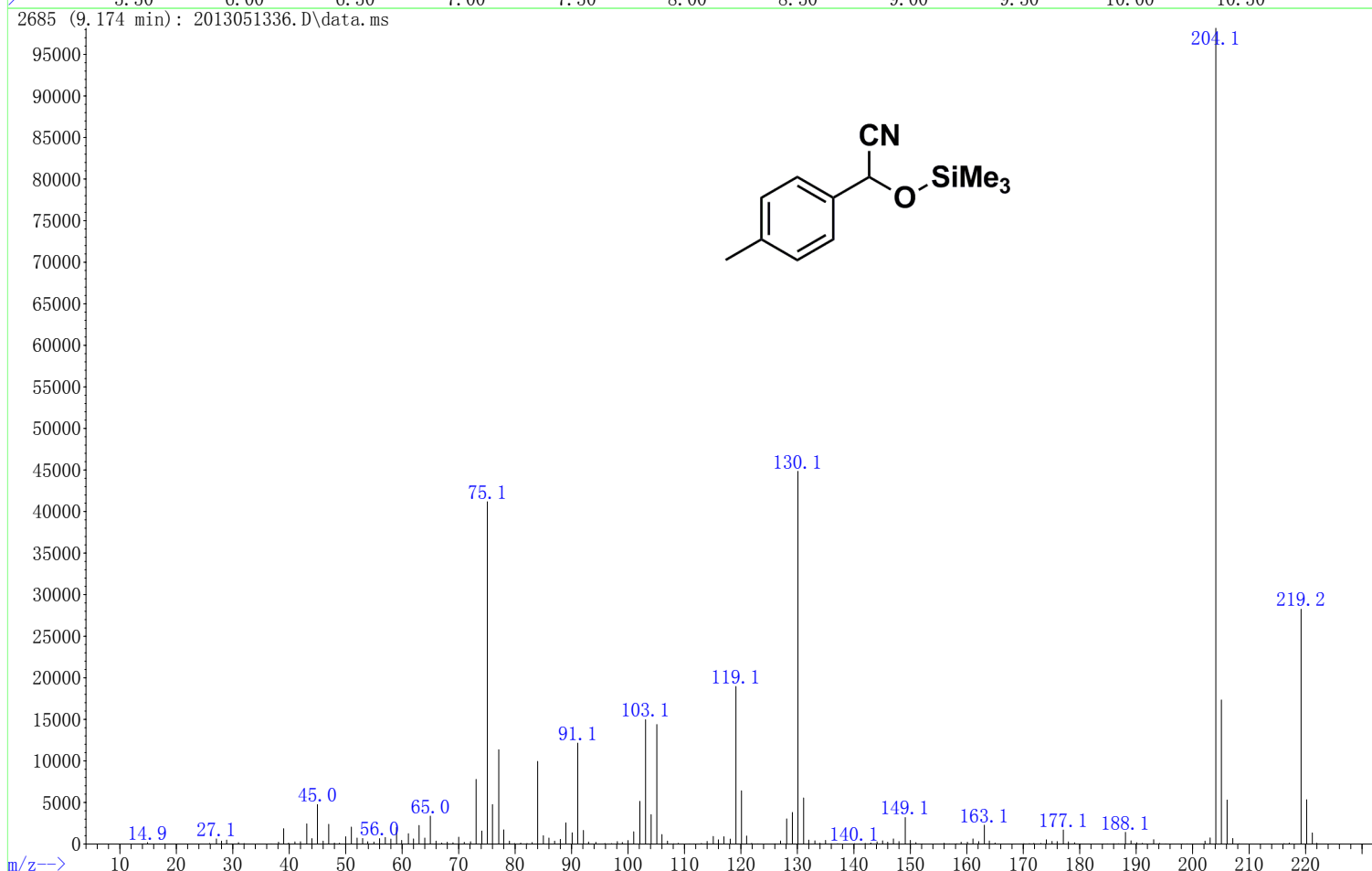
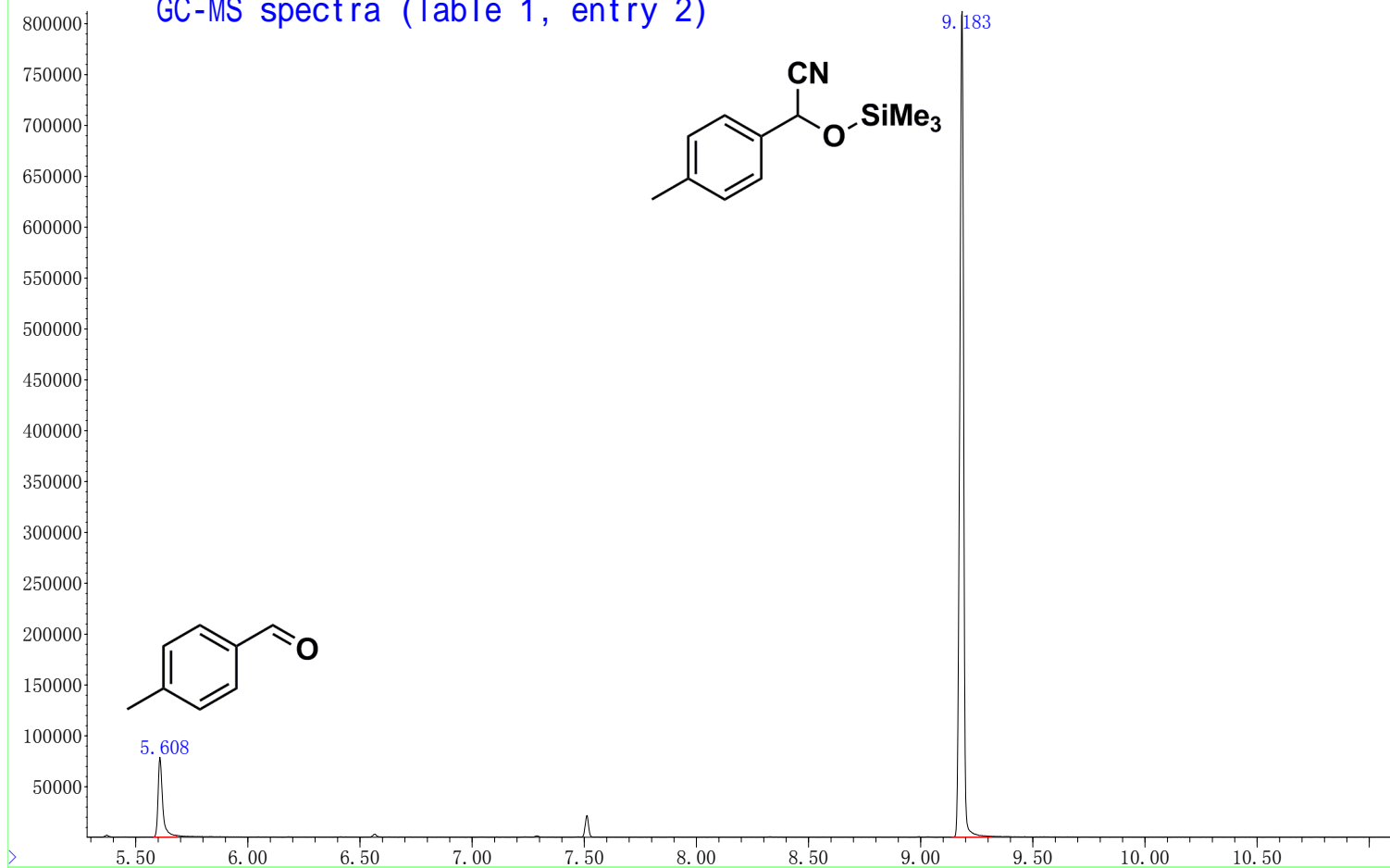


Fig. S12 Fluorescence images (excited at 245 nm) of diluted reaction solution (a) and after filtration (b).

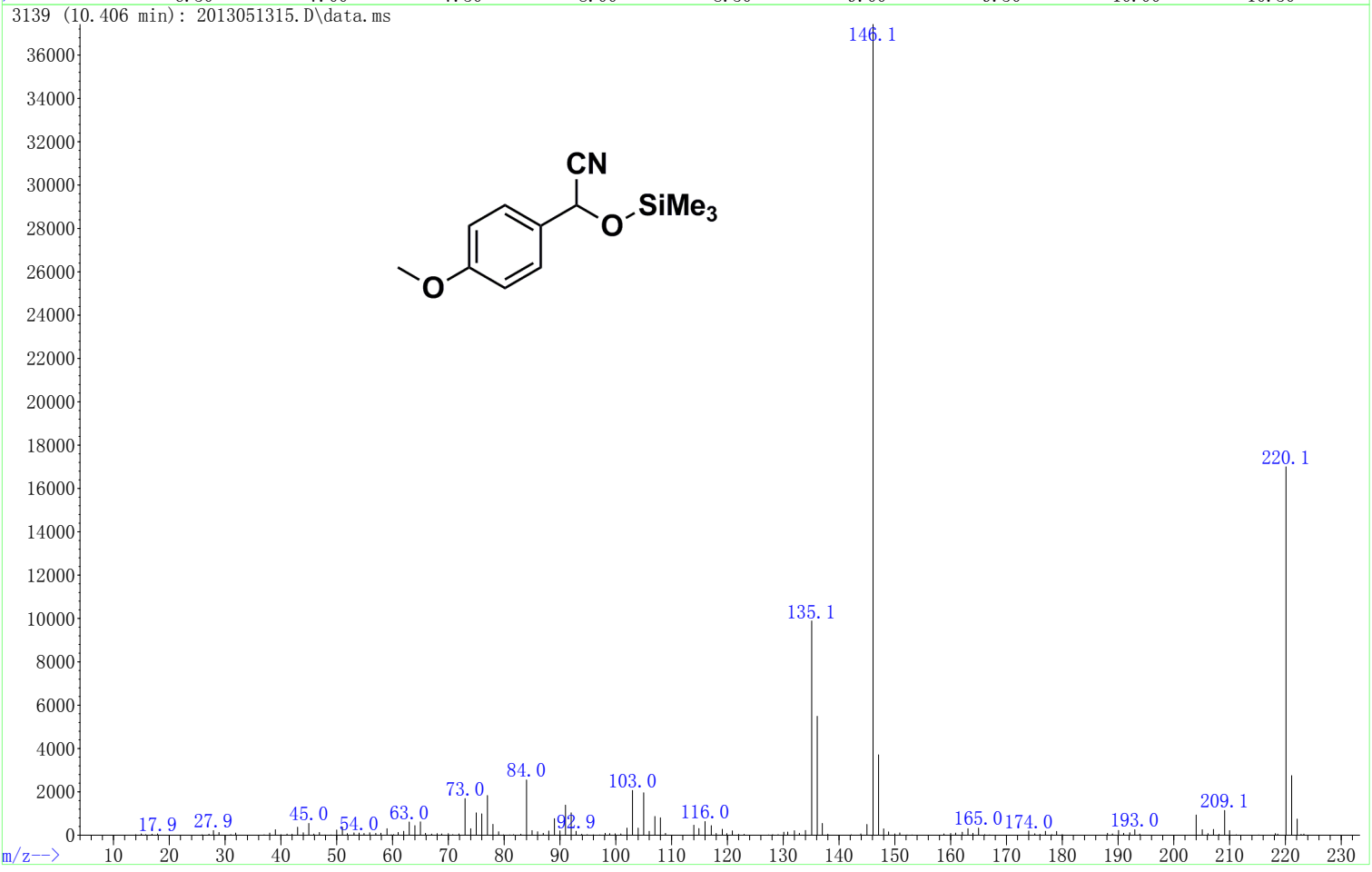
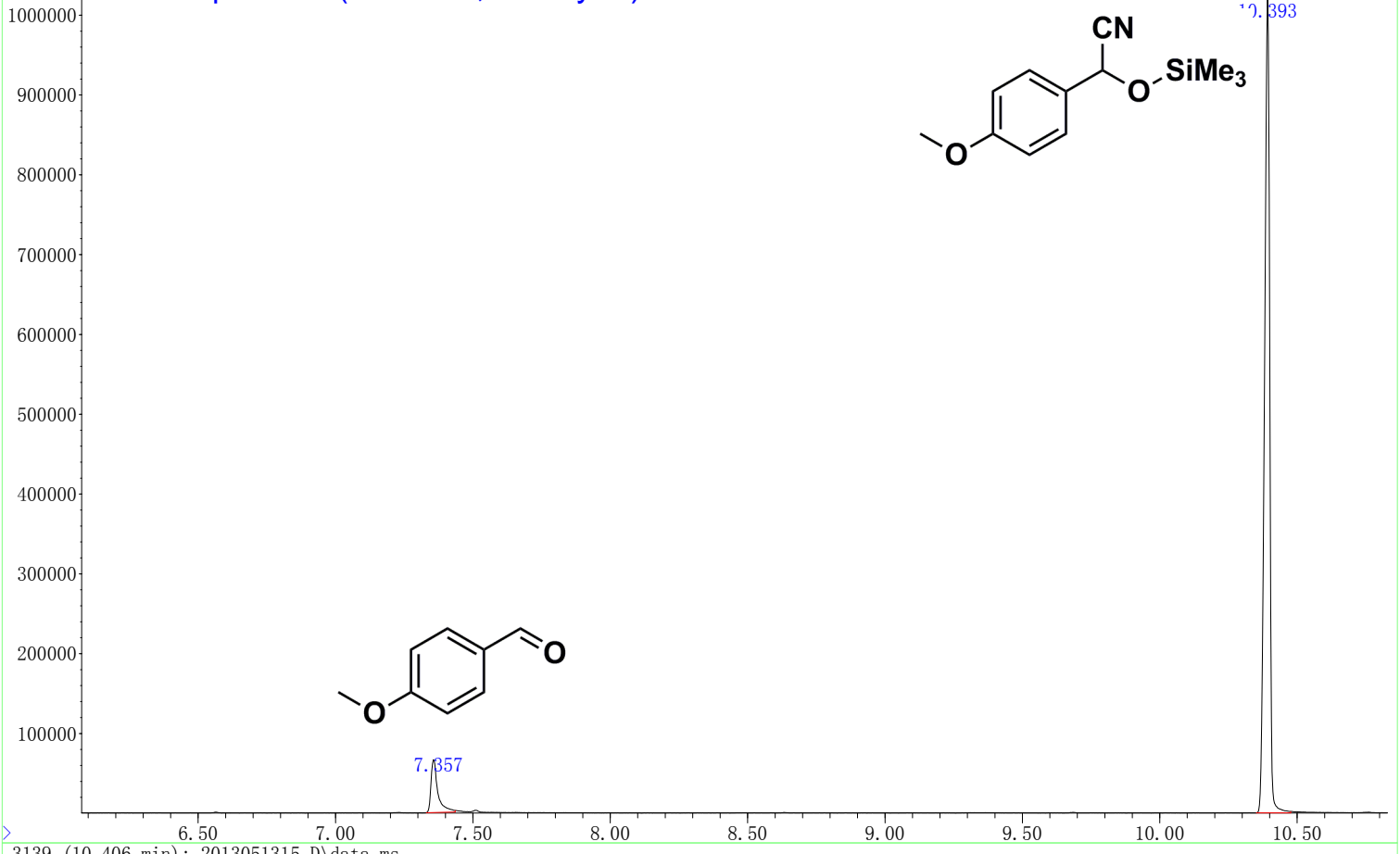
GC-MS spectra (Table 1, entry 1)



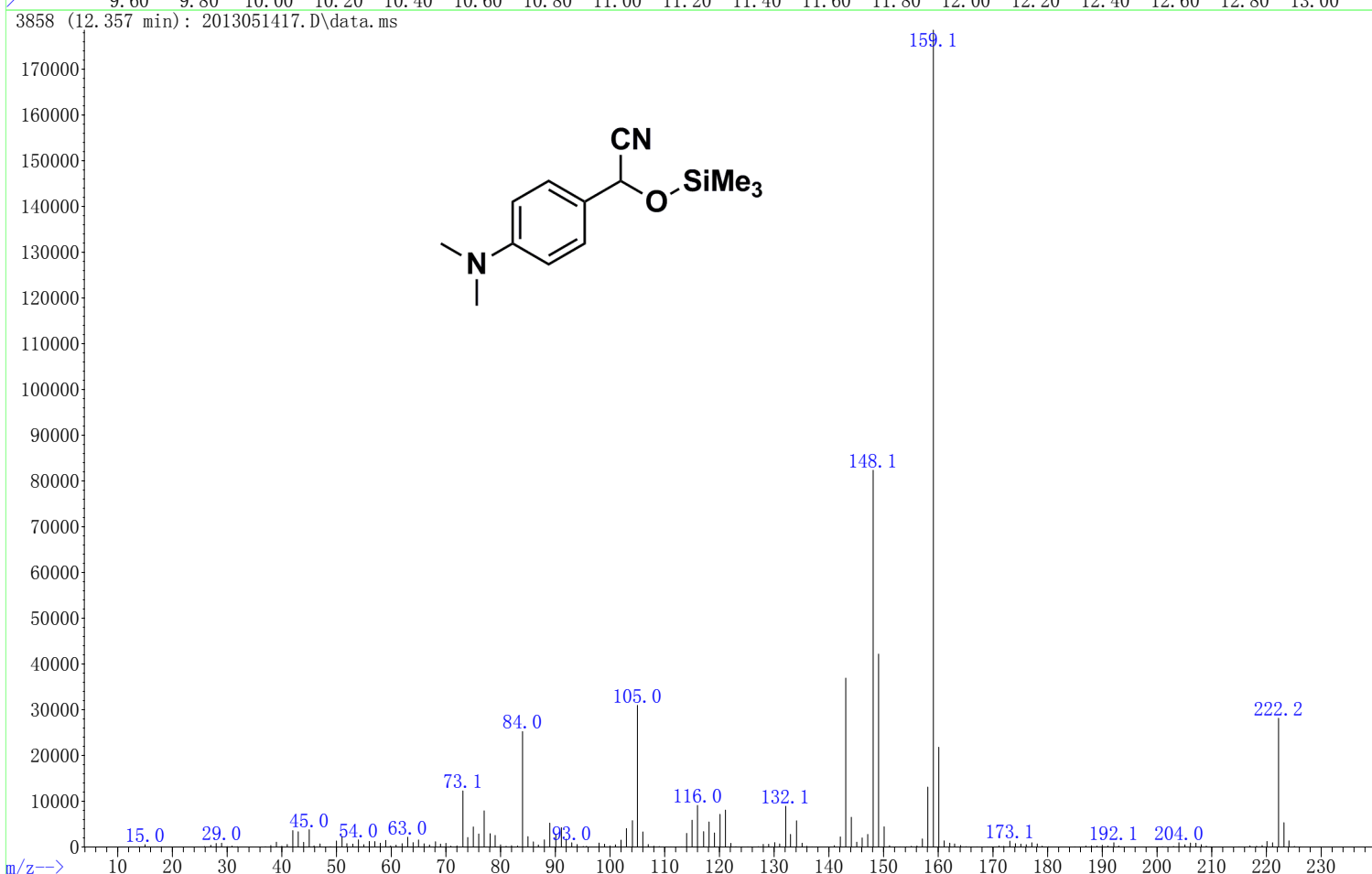
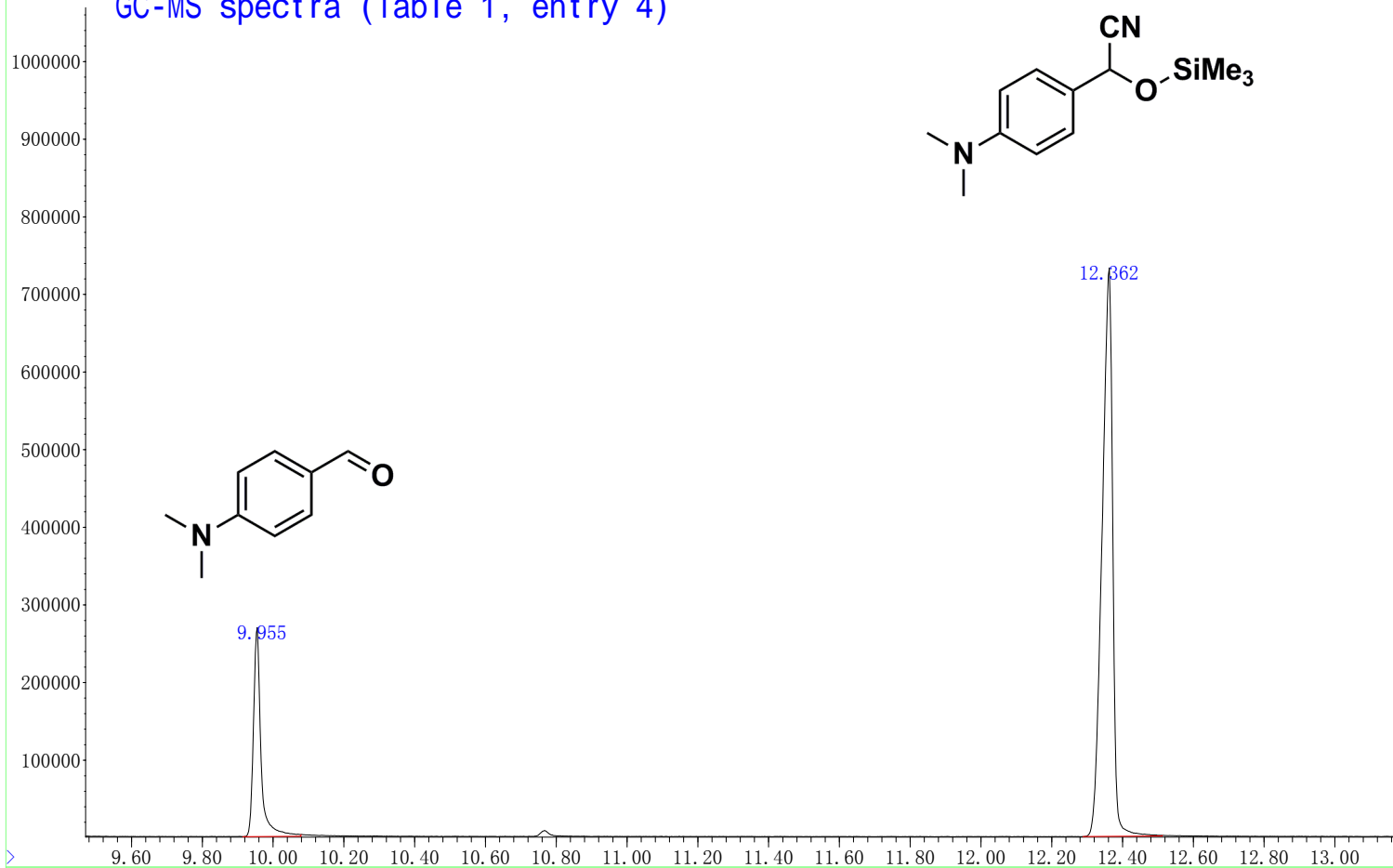
GC-MS spectra (Table 1, entry 2)



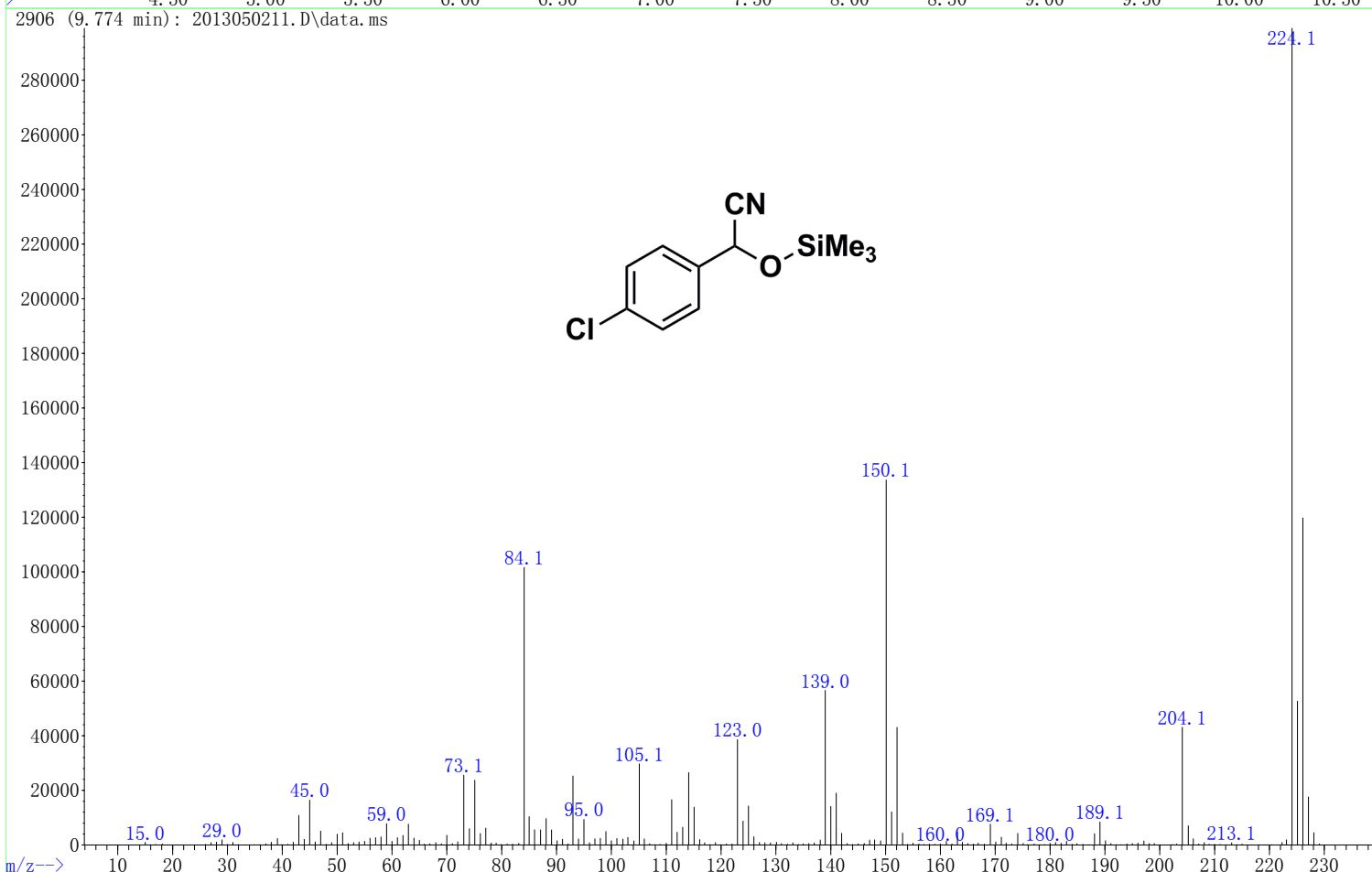
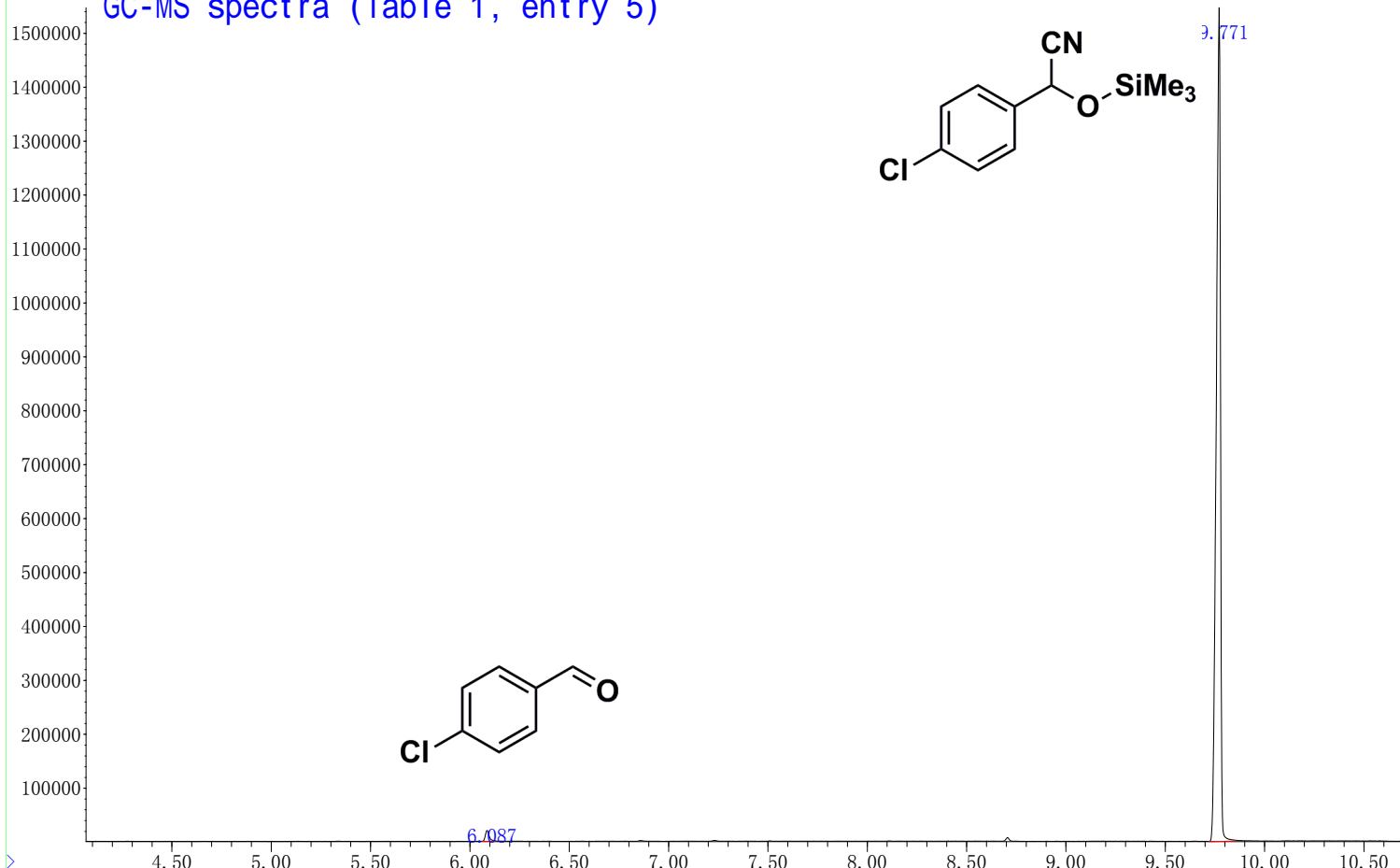
GC-MS spectra (Table 1, entry 3)



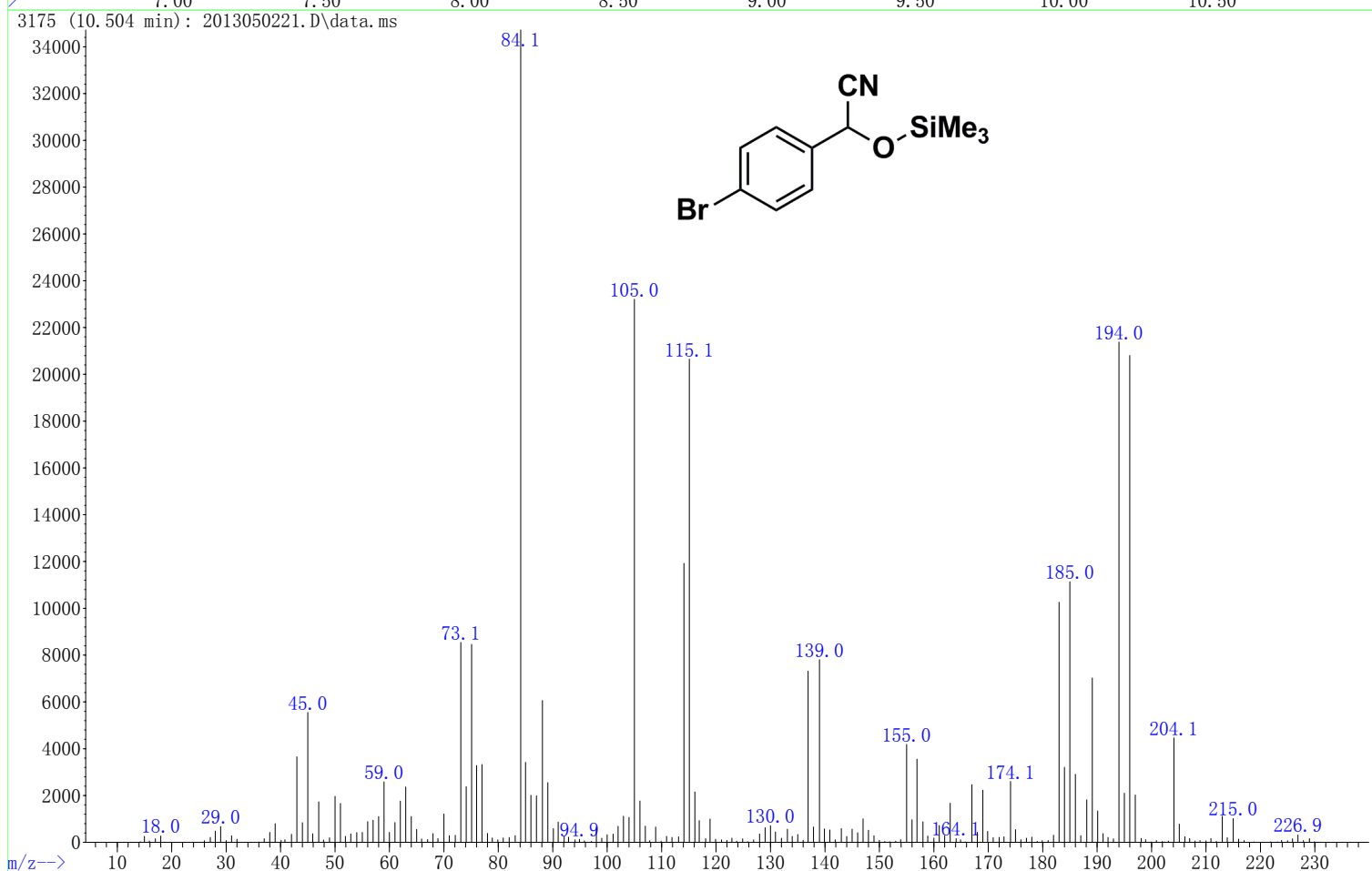
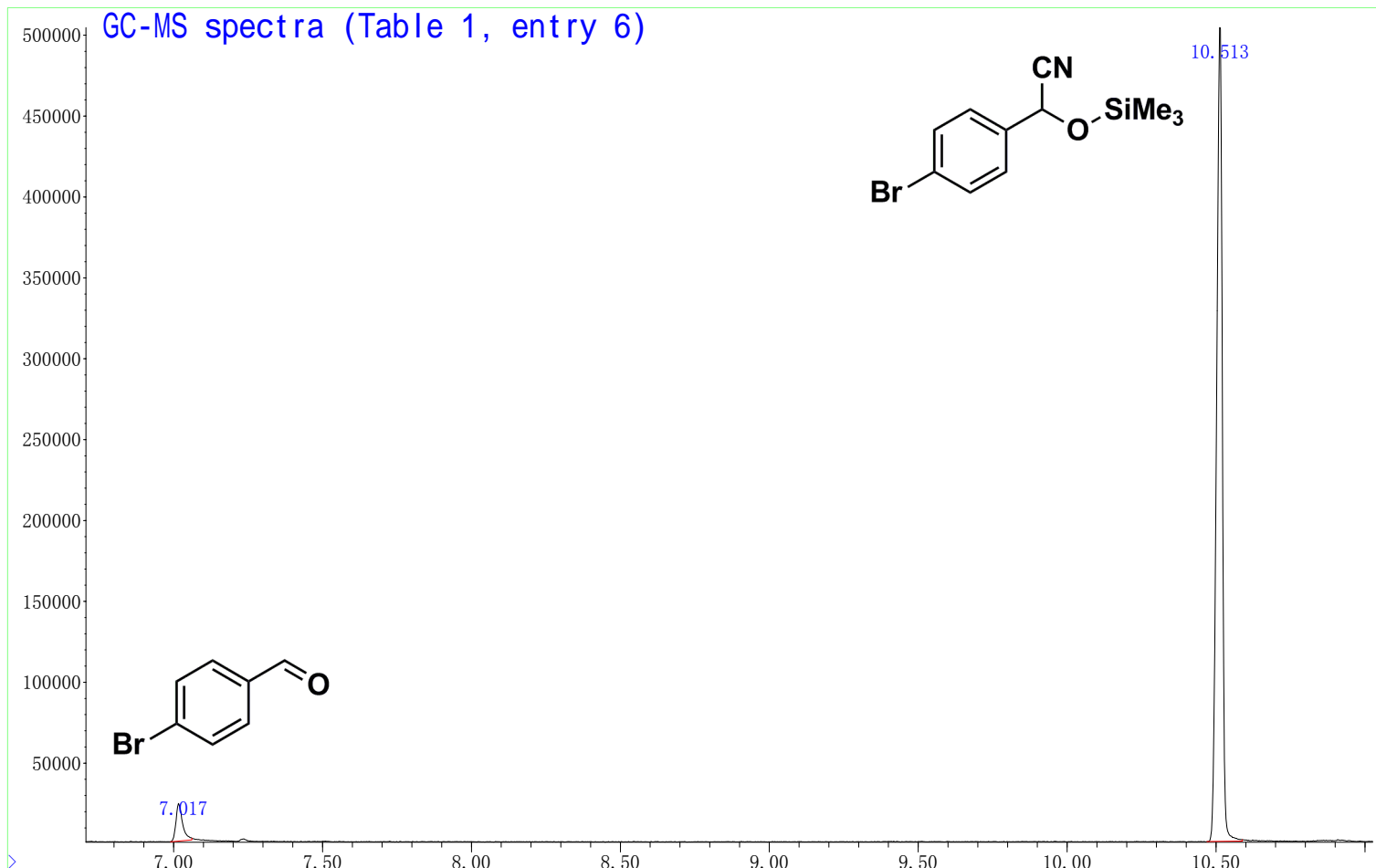
GC-MS spectra (Table 1, entry 4)



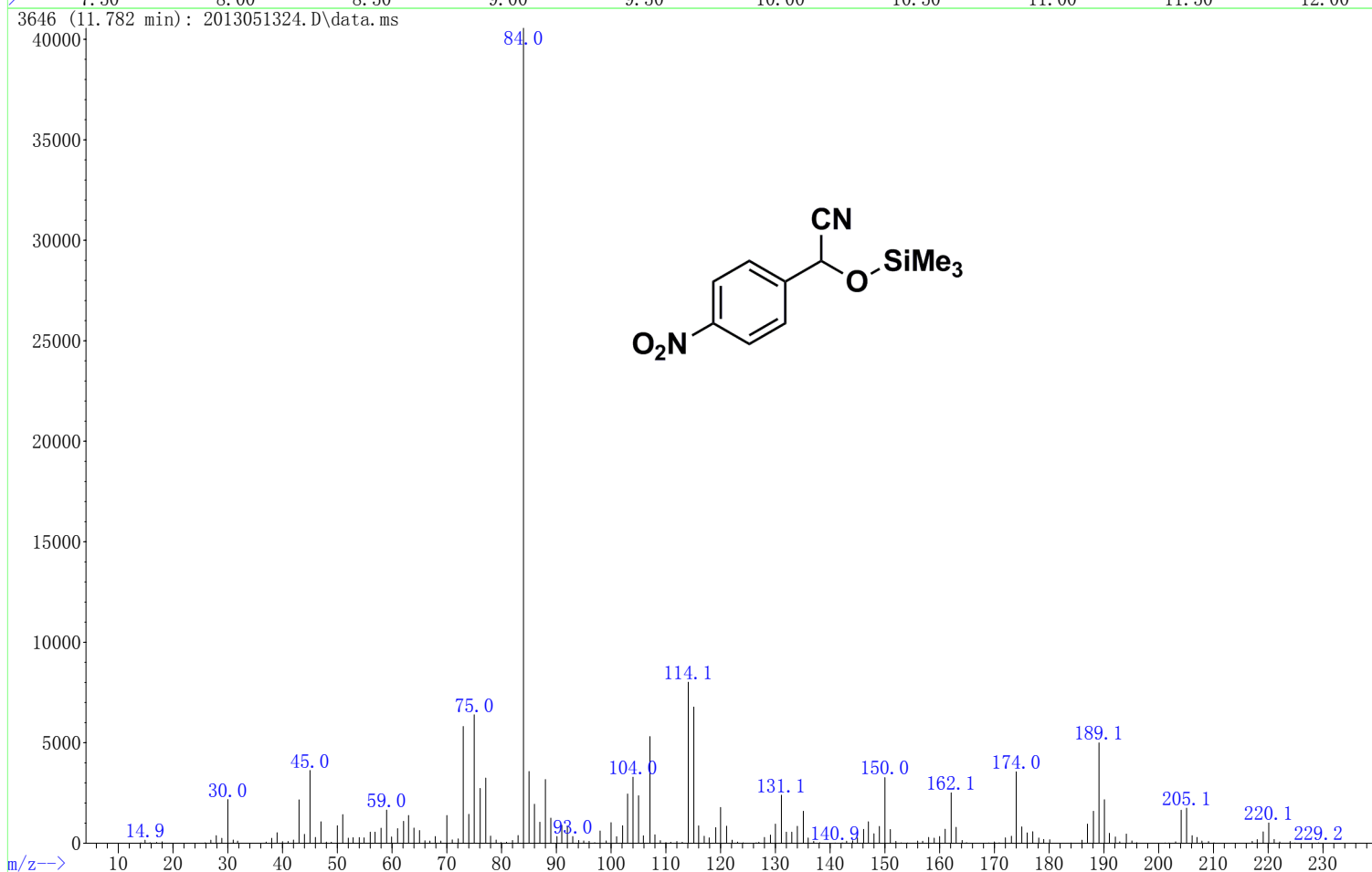
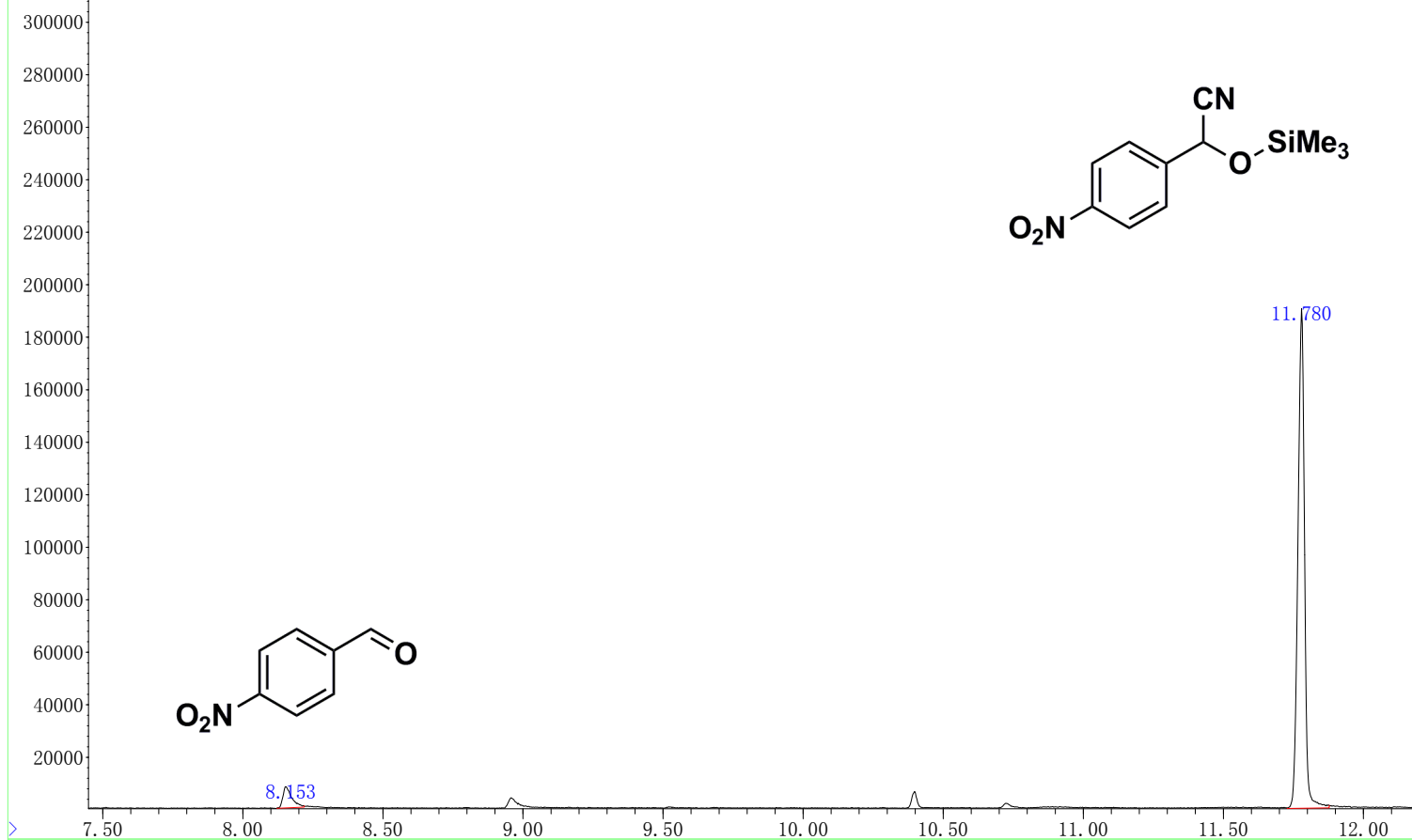
GC-MS spectra (Table 1, entry 5)



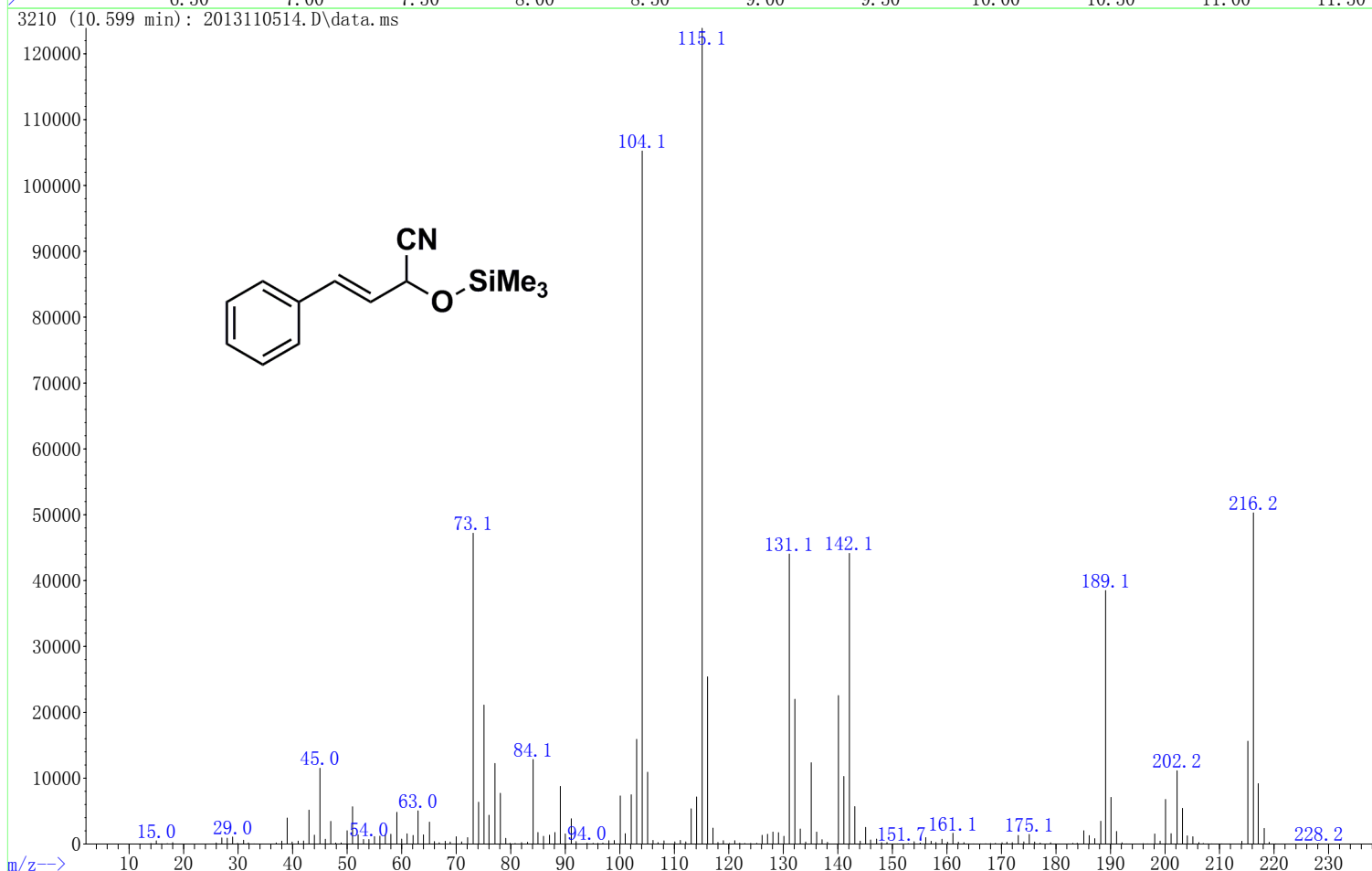
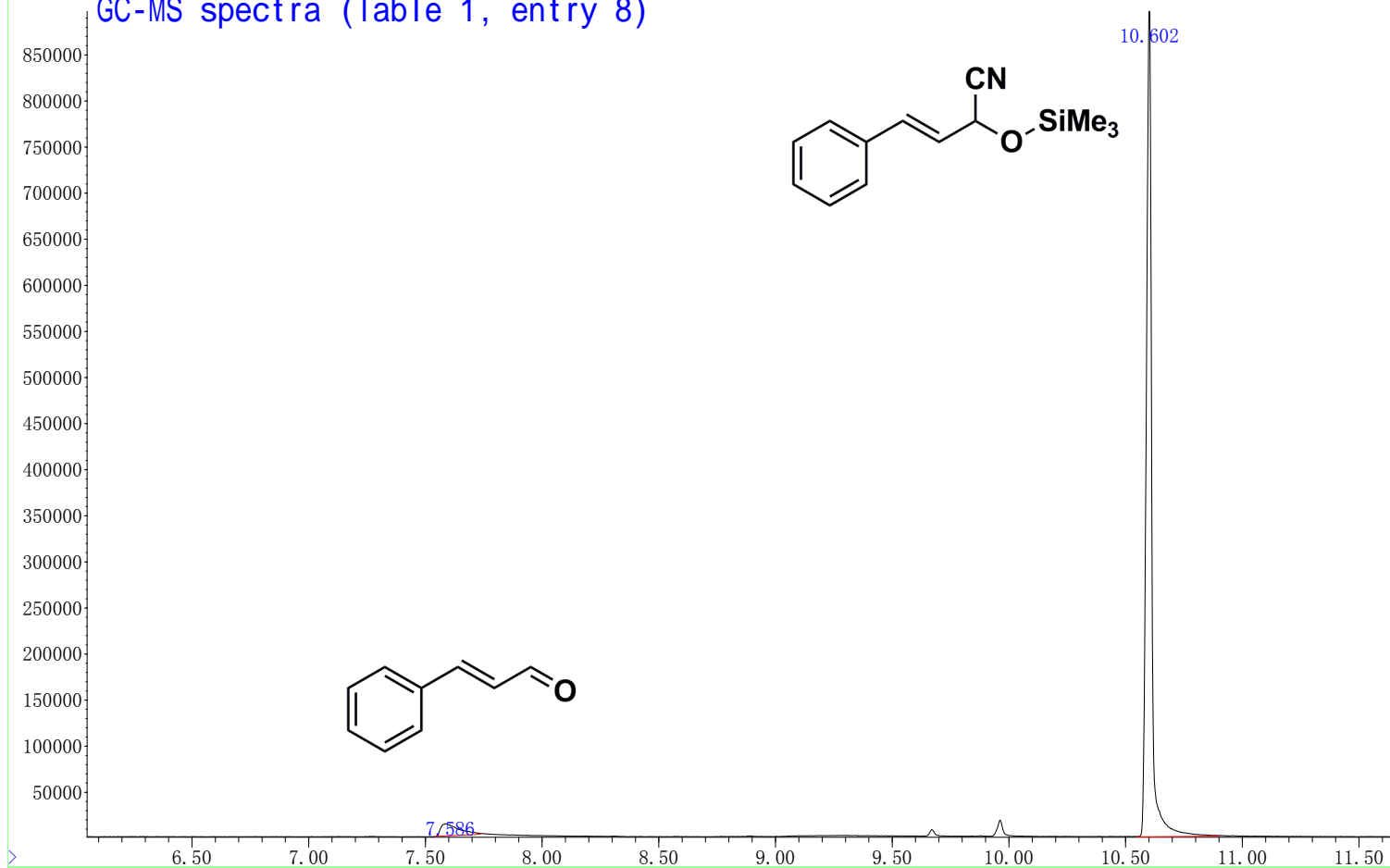
GC-MS spectra (Table 1, entry 6)



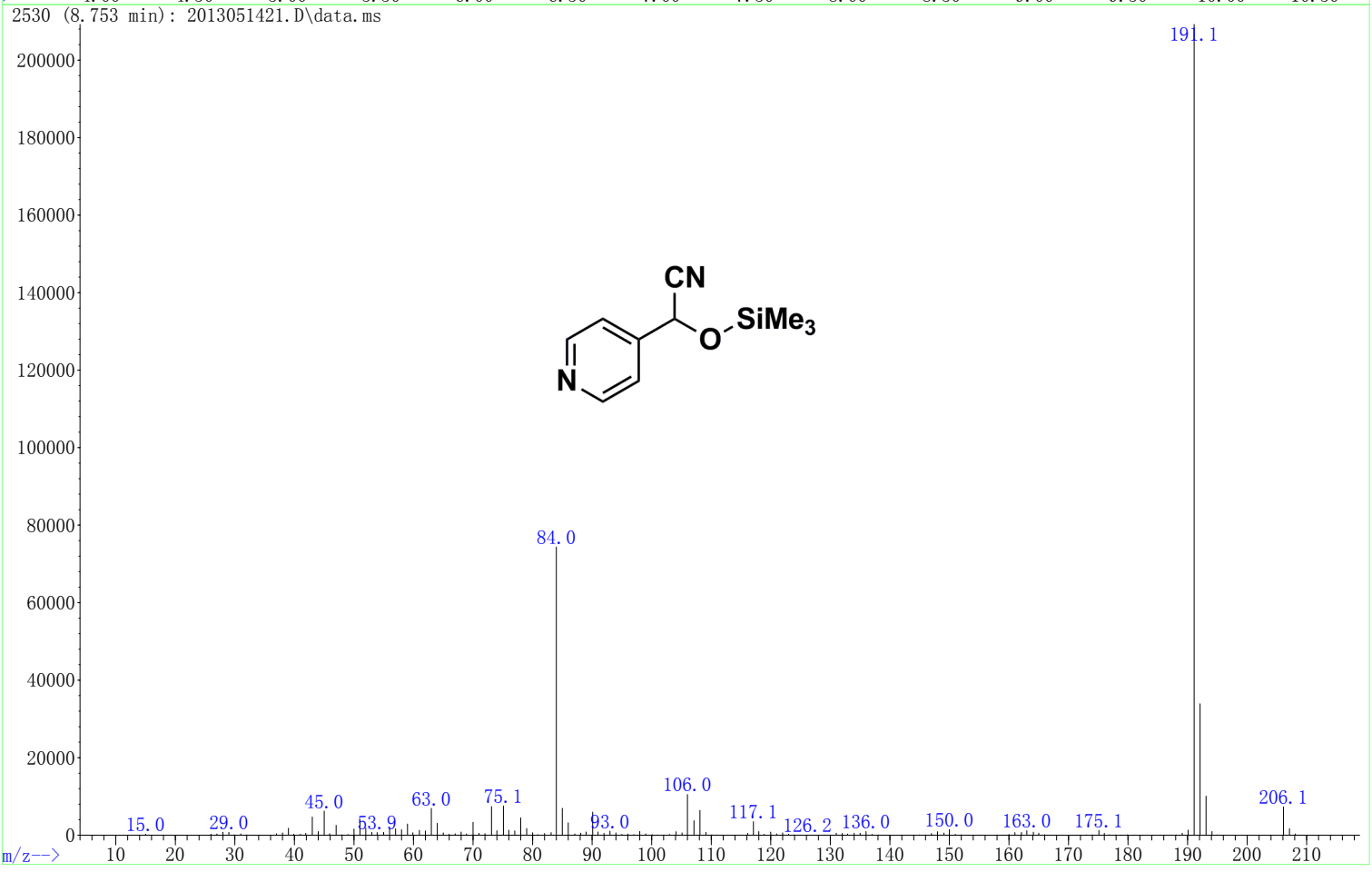
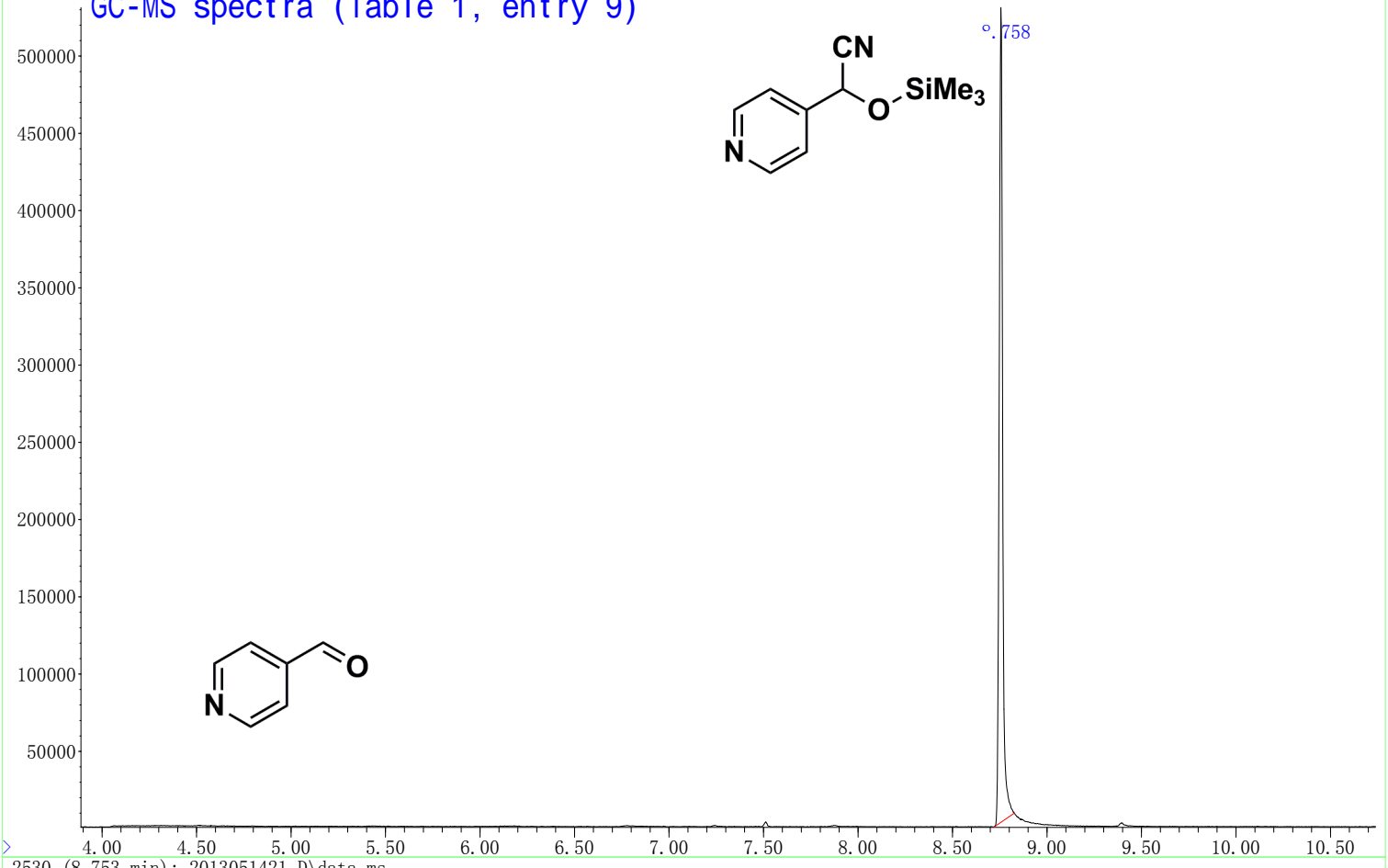
GC-MS spectra (Table 1, entry 7)



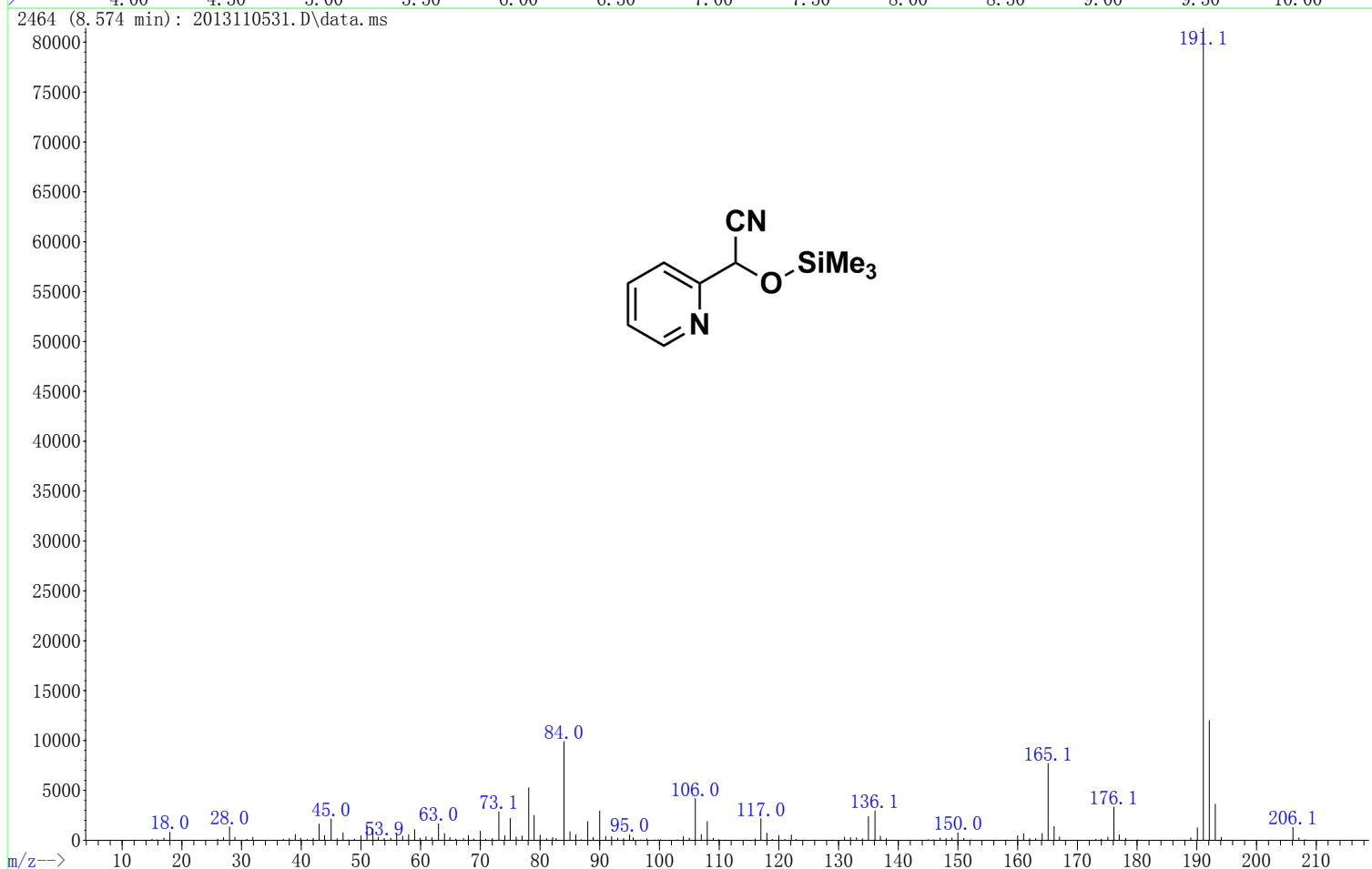
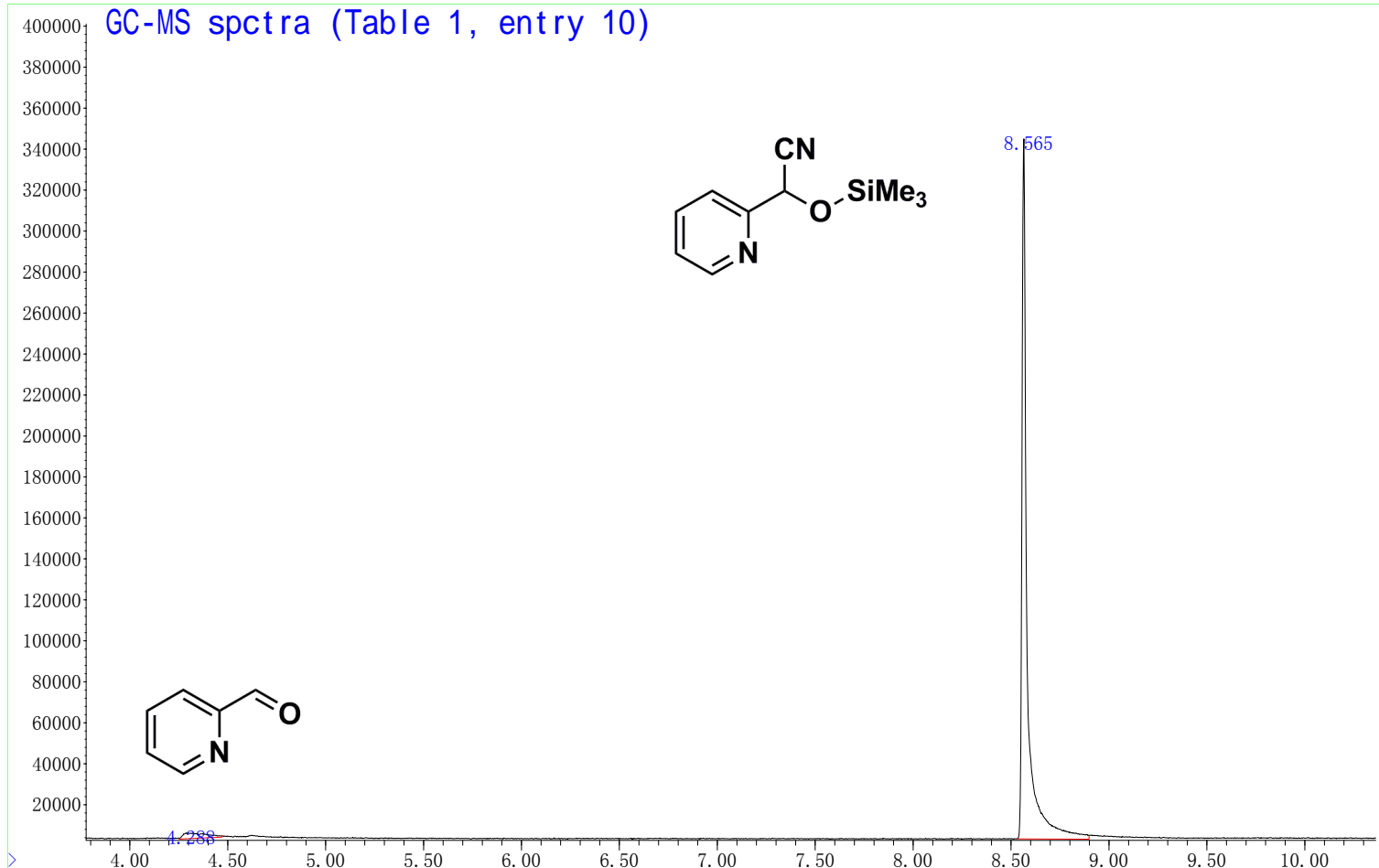
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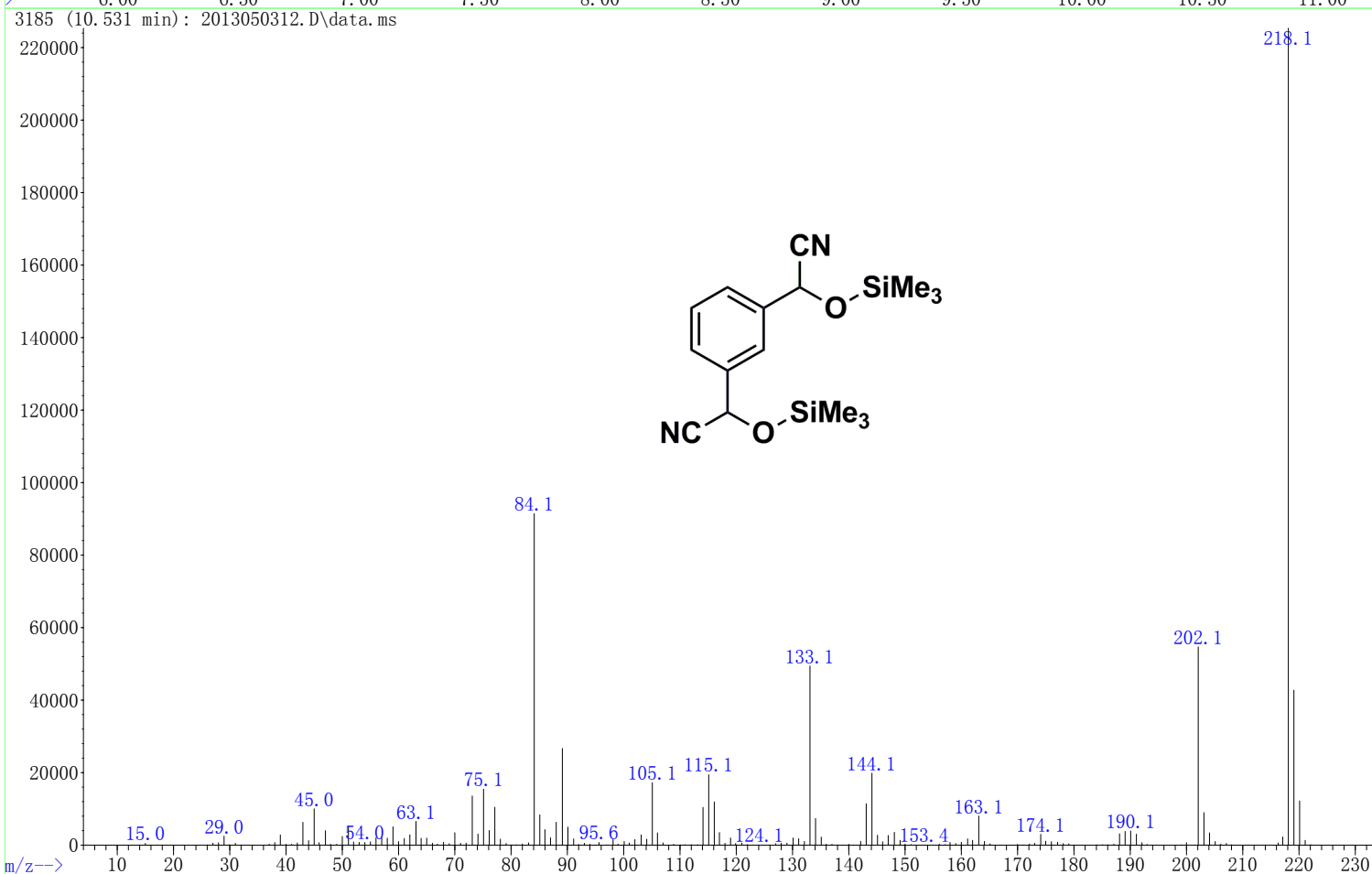
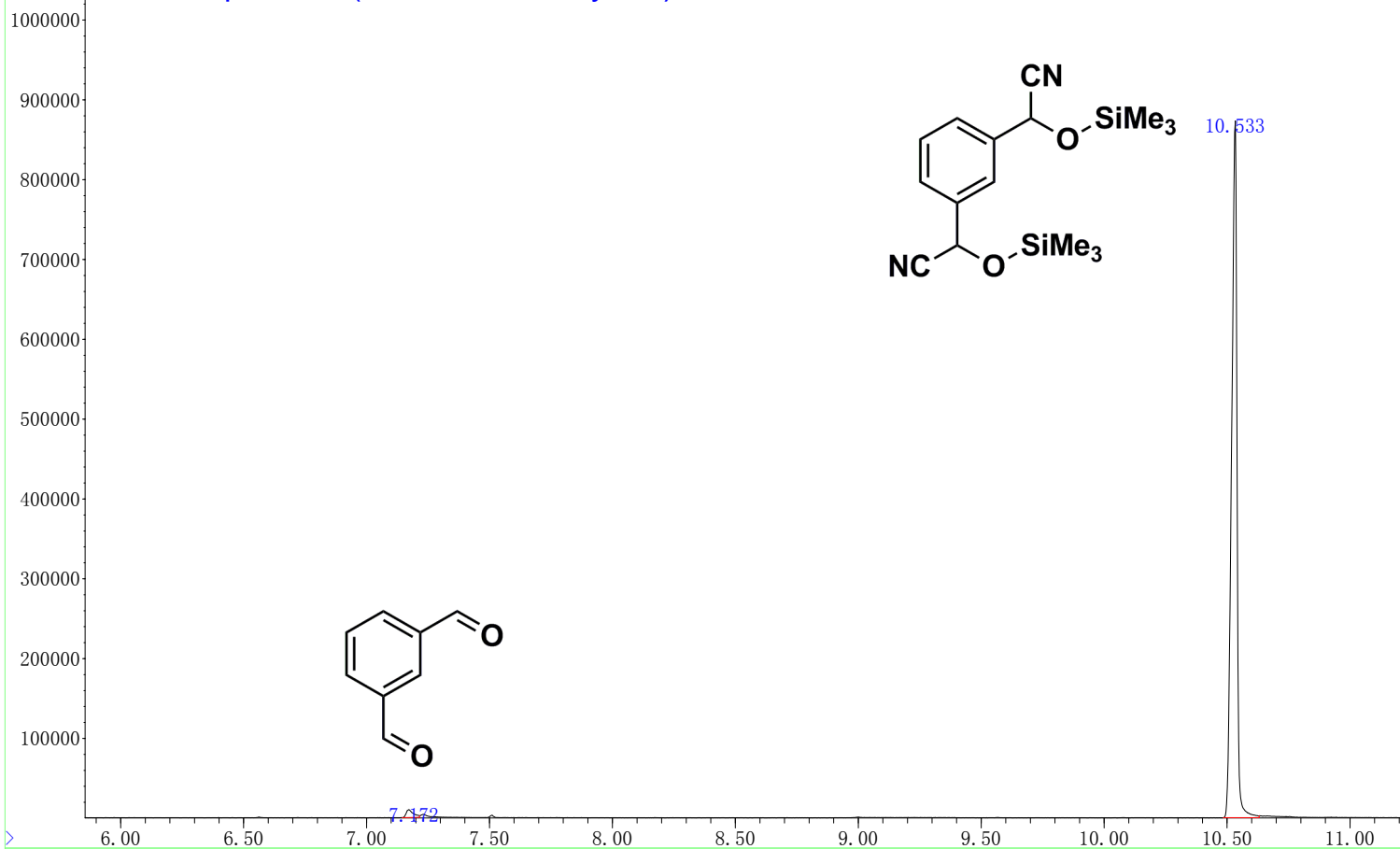
GC-MS spectra (Table 1, entry 9)



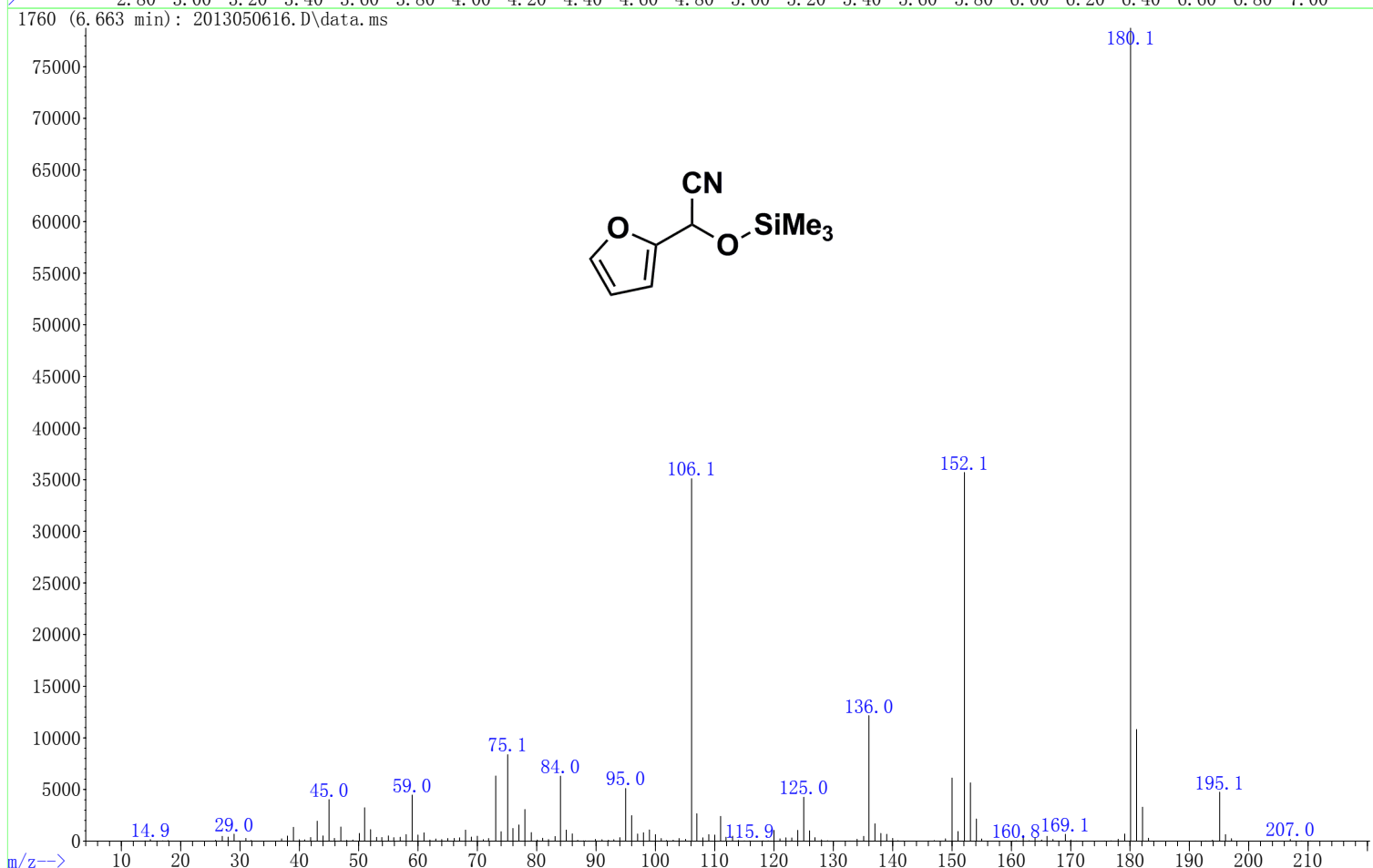
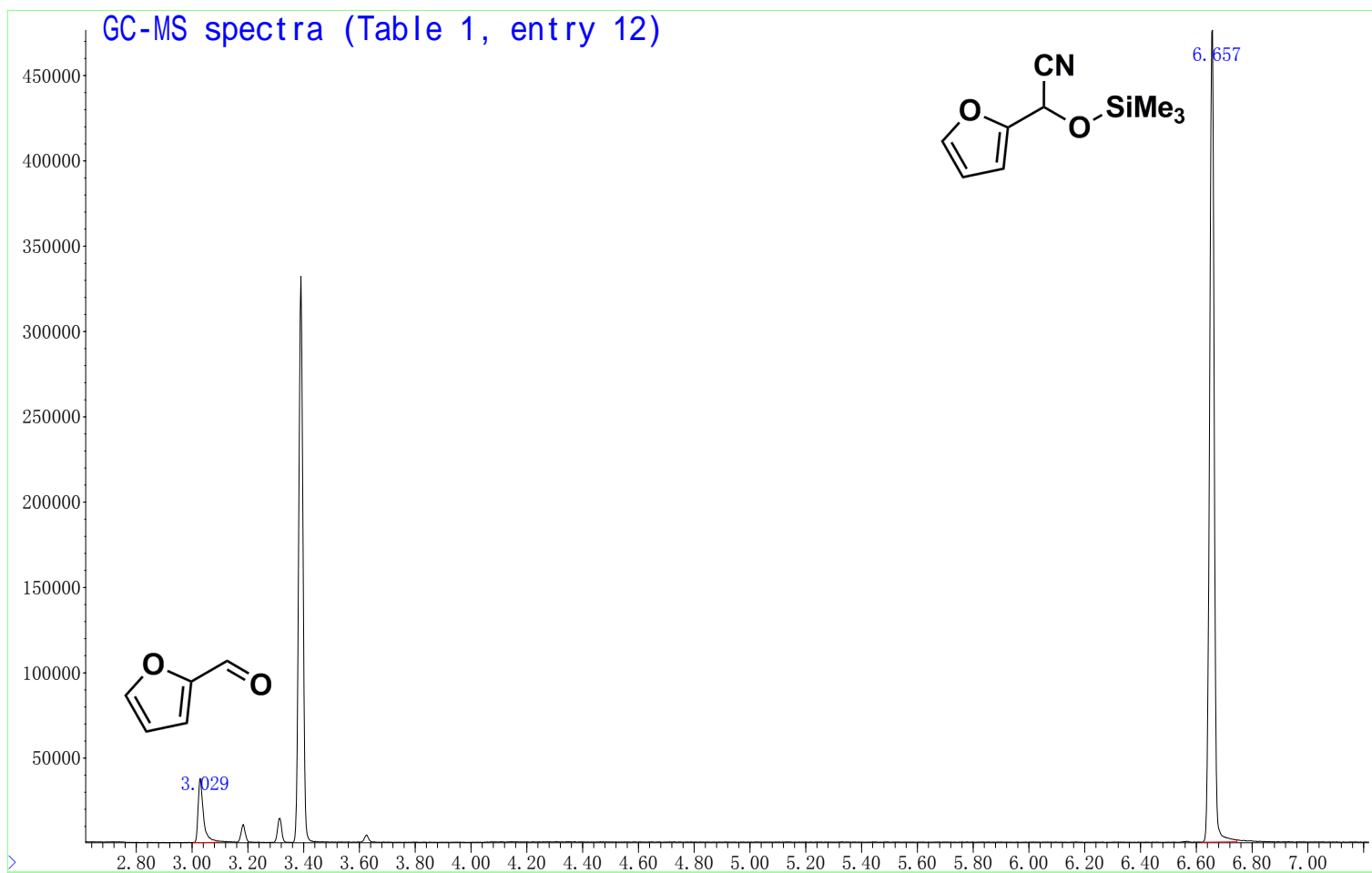
GC-MS spectra (Table 1, entry 10)



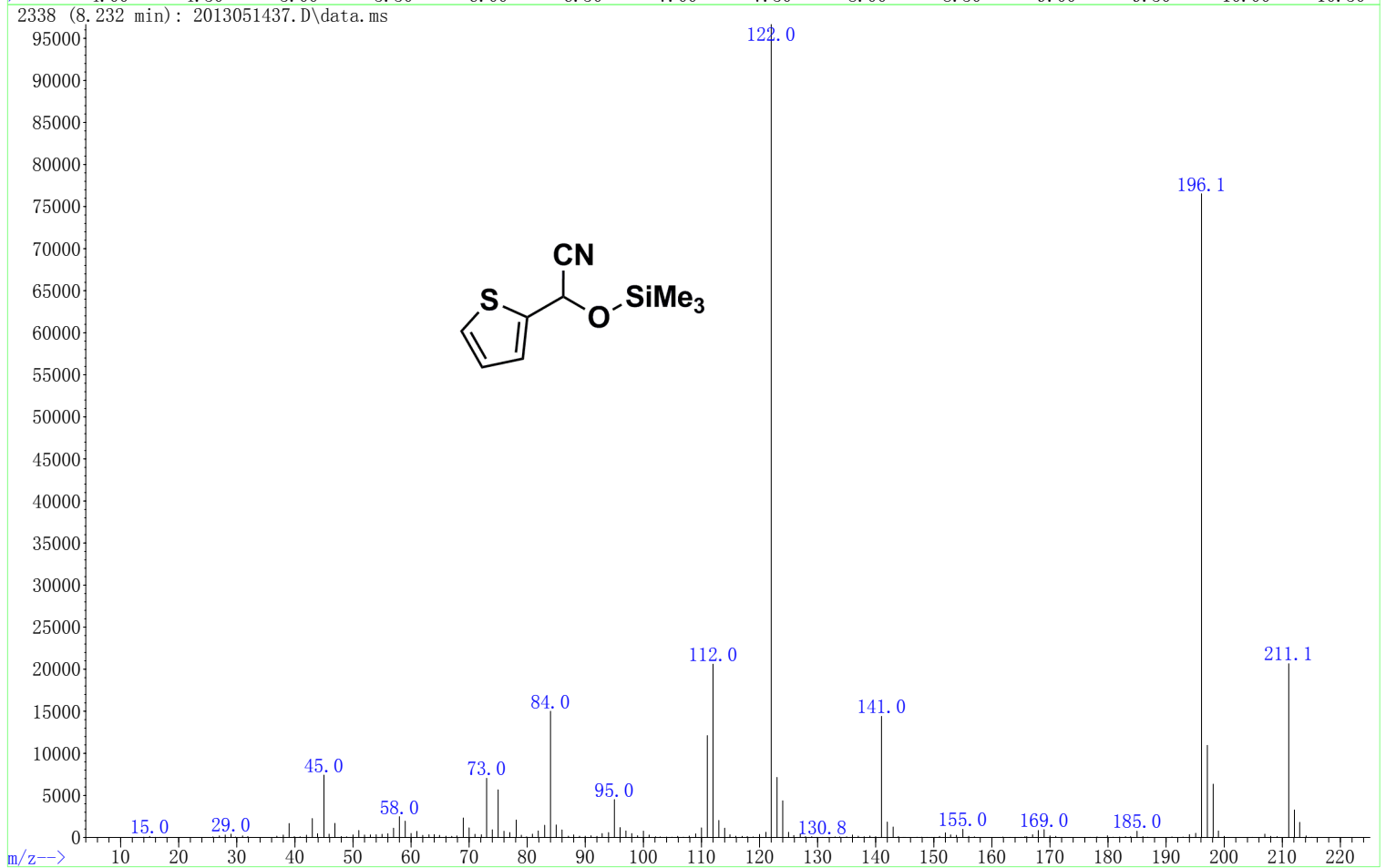
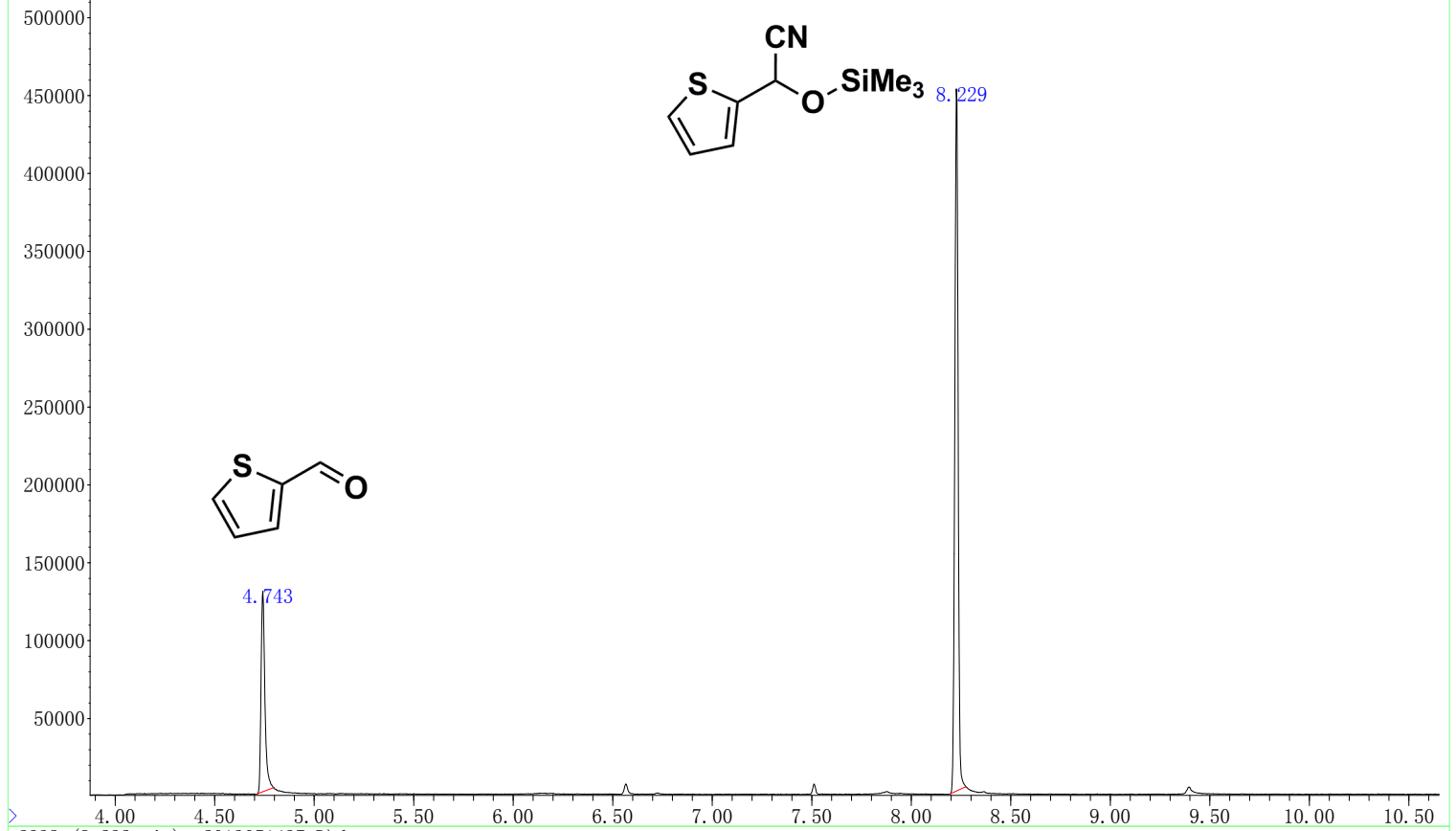
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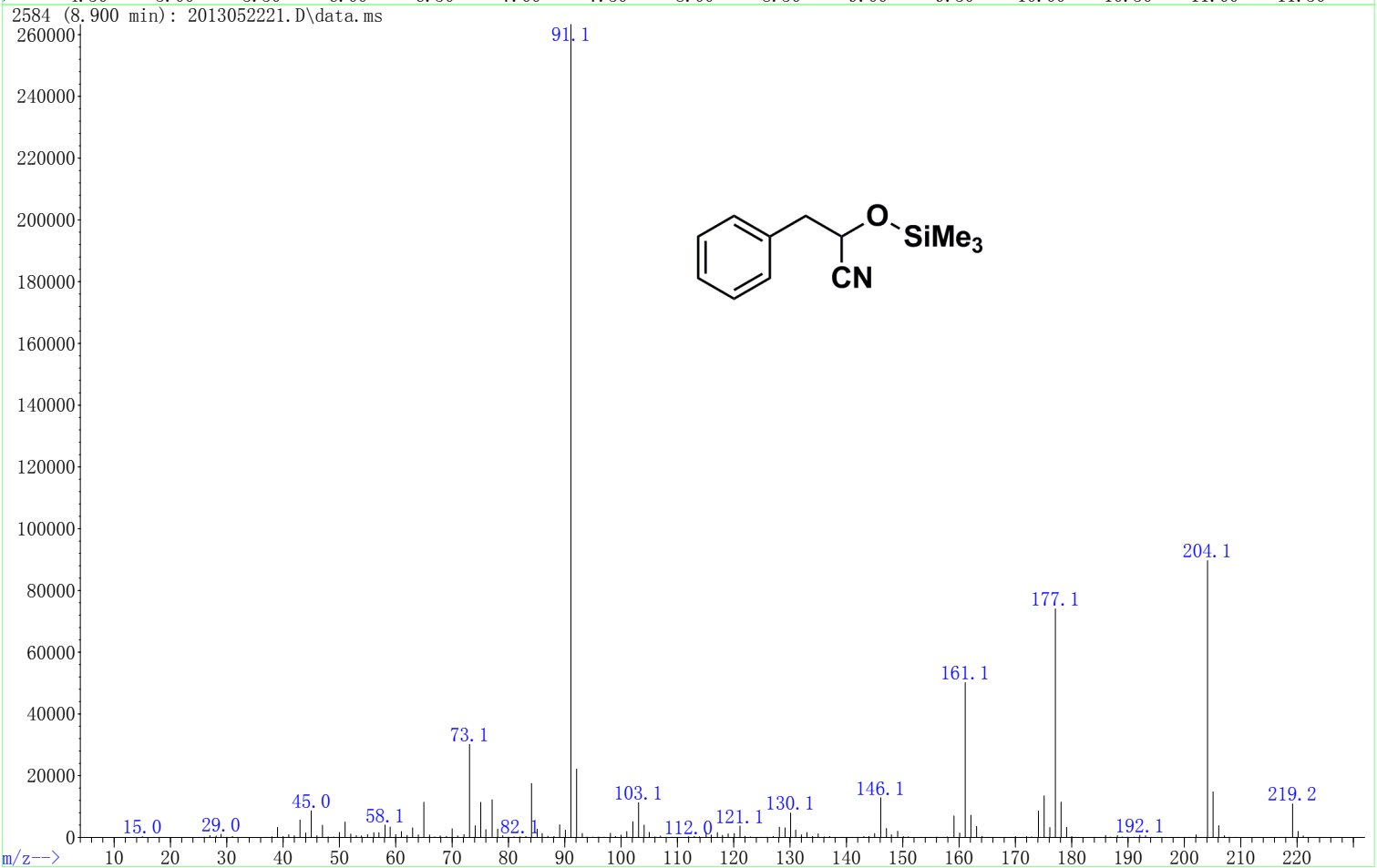
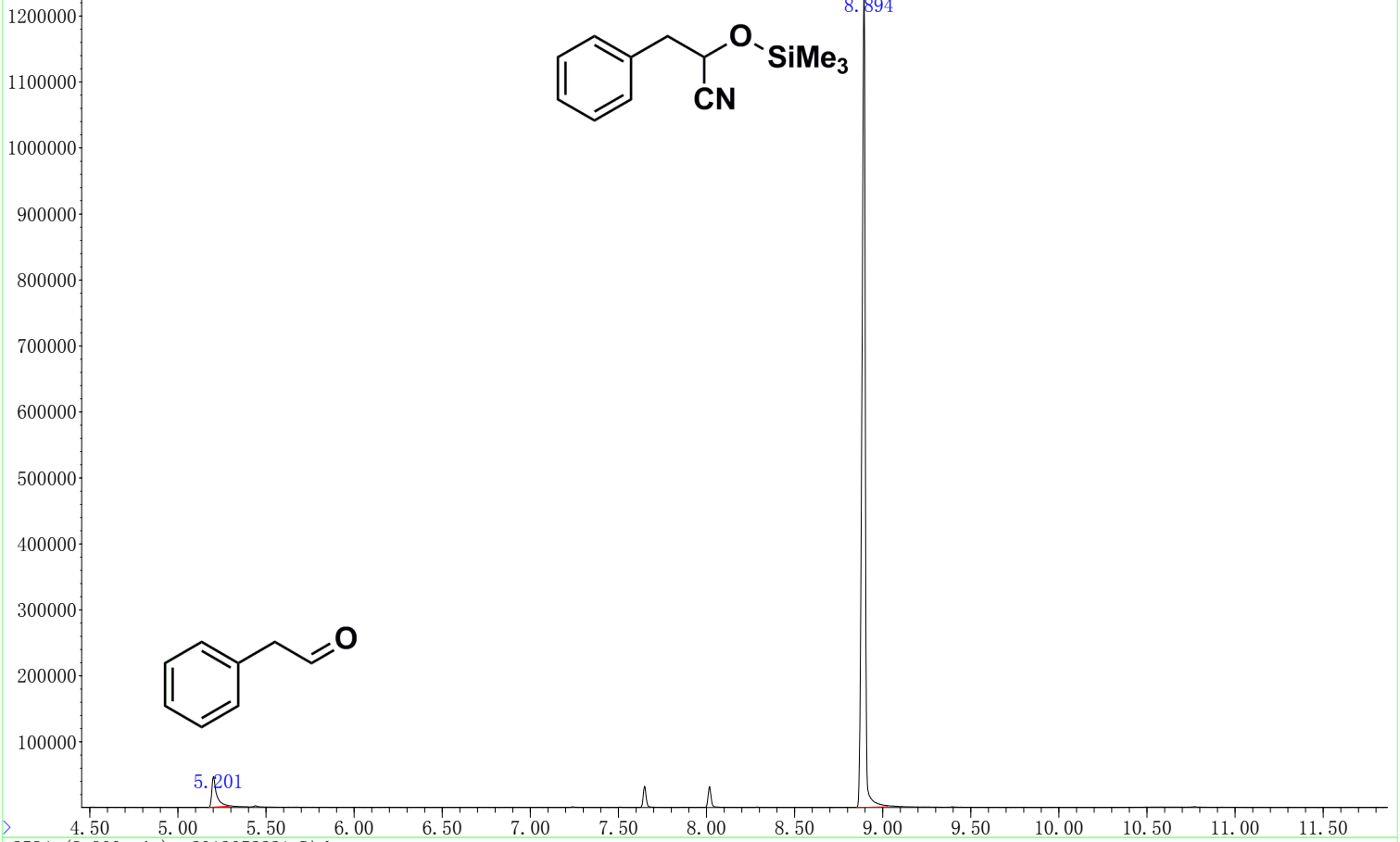
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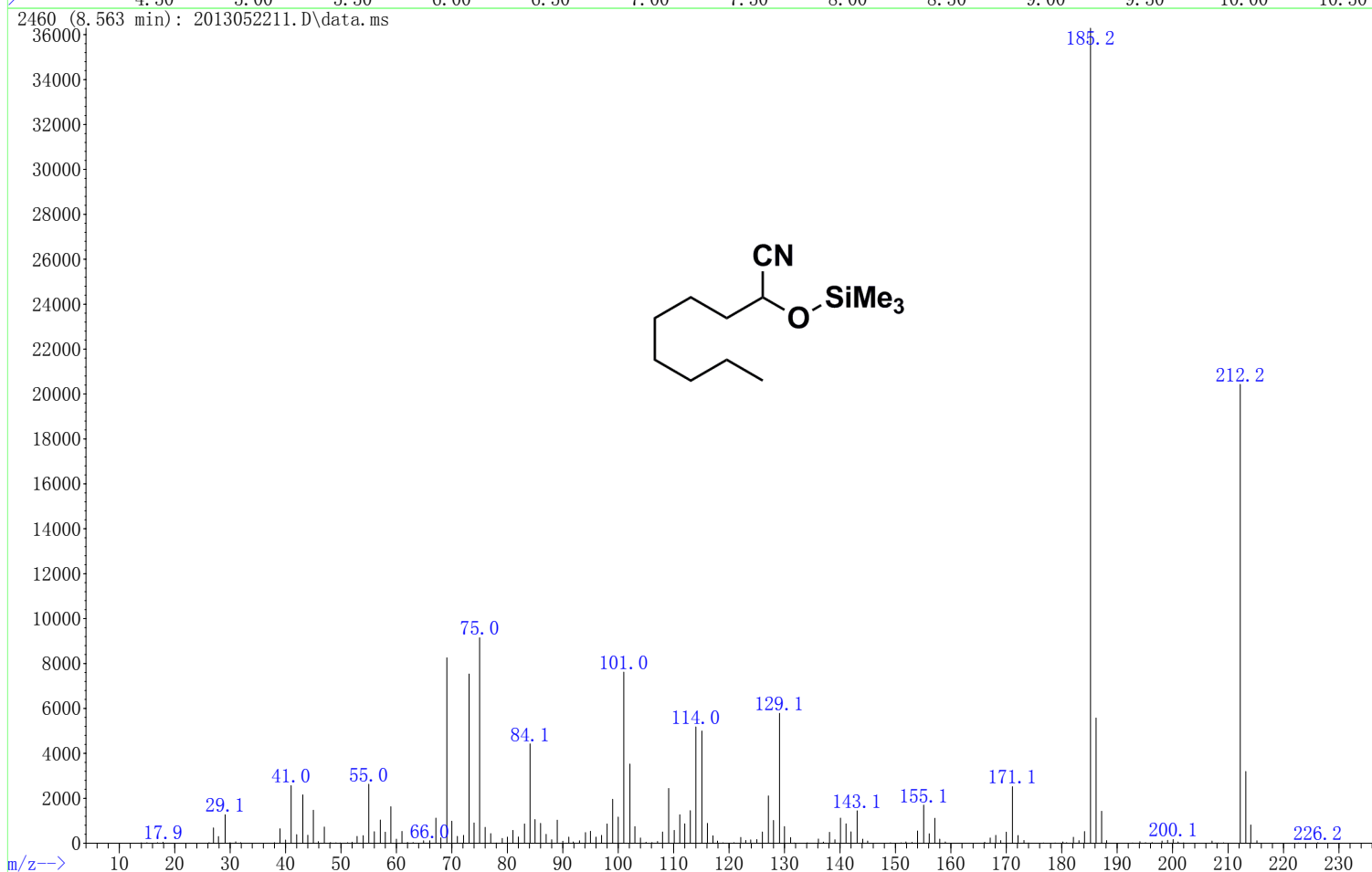
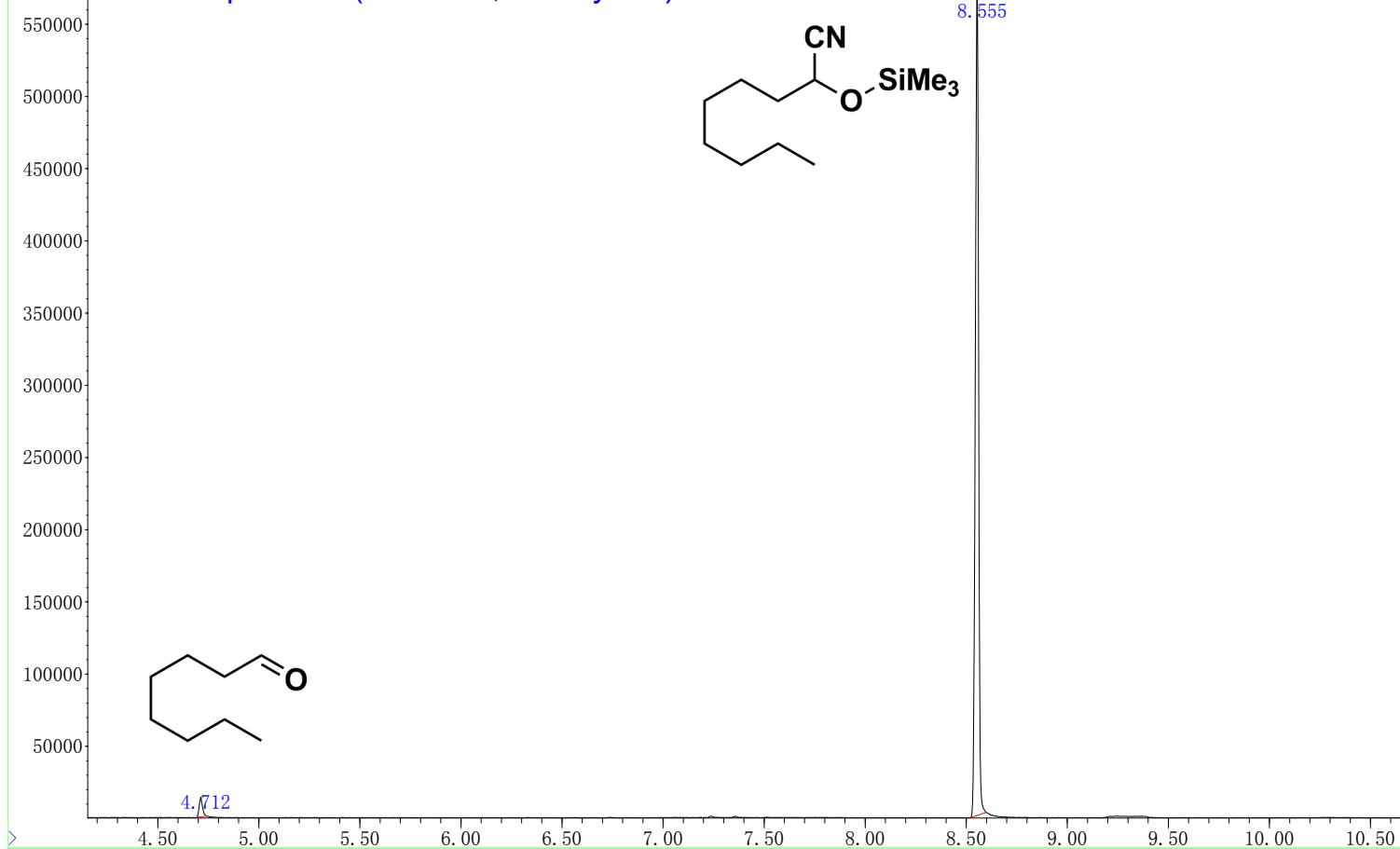
GC-MS spectra (Table 1, entry 13)



GC-MS spectra (Table 1, entry 14)



GC-MS spectra (Table 1, entry 15)



GC-MS spectra (Table 1, entry 16)

