光球 太陽大気における未同定元素の吸収線探索

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「太陽物理学と恒星物理学の相互交流と将来的展望」
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1. なぜ探索するのか？

光球の組成は恒星の基準になっている。

光球スペクトルで探す。

Table 1 Element abundances in the solar photosphere where log $N_H = 12$. Meteoritic values are from Lodders et al. (2009). Indirect photospheric estimates are marked with [. . .]

	Elem.	Photosphere	Meteorites		Elem.	Photosphere	Meteorites
1	H	12.00	8.22 ± 0.04	44	Ru	1.75 ± 0.08	1.76 ± 0.03
2	He	[10.93 ± 0.01]	1.29	45	Rh	0.91 ± 0.10	1.06 ± 0.04
3	Li	1.05 ± 0.10	3.26 ± 0.05	46	Pd	1.57 ± 0.10	1.65 ± 0.02
4	Be	1.38 ± 0.09	1.30 ± 0.03	47	Ag	0.94 ± 0.10	1.20 ± 0.02
5	B	2.70 ± 0.20	2.79 ± 0.04	48	Cd		1.71 ± 0.03
6	C	8.43 ± 0.05	7.39 ± 0.04	49	In	0.80 ± 0.20	0.76 ± 0.03
7	N	7.83 ± 0.05	6.26 ± 0.06	50	Sn	2.04 ± 0.10	2.07 ± 0.06
8	O	8.69 ± 0.05	8.40 ± 0.04	51	Sb		1.01 ± 0.06
9	F	4.56 ± 0.30	4.42 ± 0.06	52	Te		2.18 ± 0.03
10	Ne	[7.93 ± 0.10]	−1.12	53	I		1.55 ± 0.08
11	Na	6.24 ± 0.04	6.27 ± 0.02	54	Xe	[2.24 ± 0.06]	−1.95
12	Mg	7.60 ± 0.04	7.53 ± 0.01	55	Cs		1.08 ± 0.02
13	Al	6.45 ± 0.03	6.43 ± 0.01	56	Ba	2.18 ± 0.09	2.18 ± 0.03
14	Si	7.51 ± 0.03	7.51 ± 0.01	57	La	1.10 ± 0.04	1.17 ± 0.02
15	P	5.41 ± 0.03	5.43 ± 0.04	58	Ce	1.58 ± 0.04	1.58 ± 0.02
16	S	7.12 ± 0.03	7.15 ± 0.02	59	Pr	0.72 ± 0.04	0.76 ± 0.03
17	Cl	5.50 ± 0.30	5.23 ± 0.06	60	Nd	1.42 ± 0.04	1.45 ± 0.02
18	Ar	[6.40 ± 0.13]	−0.50	62	Sm	0.96 ± 0.04	0.94 ± 0.02
19	K	5.03 ± 0.09	5.08 ± 0.02	63	Eu	0.52 ± 0.04	0.51 ± 0.02
20	Ca	6.34 ± 0.04	6.29 ± 0.02	64	Gd	1.07 ± 0.04	1.05 ± 0.02
21	Sc	3.15 ± 0.04	3.05 ± 0.02	65	Tb	0.30 ± 0.10	0.32 ± 0.03
22	Ti	4.95 ± 0.05	4.91 ± 0.03	66	Dy	1.10 ± 0.04	1.13 ± 0.02
23	V	3.93 ± 0.08	3.96 ± 0.02	67	Ho	0.48 ± 0.11	0.47 ± 0.03
24	Cr	5.64 ± 0.04	5.64 ± 0.01	68	Er	0.92 ± 0.05	0.92 ± 0.02
25	Mn	5.43 ± 0.04	5.48 ± 0.01	69	Tm	0.10 ± 0.04	0.12 ± 0.03
26	Fe	7.50 ± 0.04	7.45 ± 0.01	70	Yb	0.84 ± 0.11	0.92 ± 0.02
27	Co	4.99 ± 0.07	4.87 ± 0.01	71	Lu	0.10 ± 0.09	0.09 ± 0.02
28	Ni	6.22 ± 0.04	6.20 ± 0.01	72	Hf	0.85 ± 0.04	0.71 ± 0.02
29	Cu	4.19 ± 0.04	4.25 ± 0.04	73	Ta		−0.12 ± 0.04
30	Zn	4.56 ± 0.05	4.63 ± 0.04	74	W	0.85 ± 0.12	0.65 ± 0.04
31	Ga	3.04 ± 0.09	3.08 ± 0.02	75	Re		0.26 ± 0.04
32	Ge	3.65 ± 0.10	3.58 ± 0.04	76	Os	1.40 ± 0.08	1.35 ± 0.03
33	As		2.30 ± 0.04	77	Ir	1.38 ± 0.07	1.32 ± 0.02
34	Se		3.34 ± 0.03	78	Pt		1.62 ± 0.03
35	Br		2.54 ± 0.06	79	Au	0.92 ± 0.10	0.80 ± 0.04
36	Kr	[3.25 ± 0.06]	−2.27	80	Hg		1.17 ± 0.08
37	Rb	2.52 ± 0.10	2.36 ± 0.03	81	Tl	0.90 ± 0.20	0.77 ± 0.03
38	Sr	2.87 ± 0.07	2.88 ± 0.03	82	Pb	1.75 ± 0.10	2.04 ± 0.03
39	Y	2.21 ± 0.05	2.17 ± 0.04	83	Bi		0.65 ± 0.04
40	Zr	2.58 ± 0.04	2.53 ± 0.04	90	Th	0.02 ± 0.10	0.06 ± 0.03
41	Nb	1.46 ± 0.04	1.41 ± 0.04	92	U		−0.54 ± 0.03
42	Mo	1.88 ± 0.08	1.94 ± 0.04				

Grevesse + (2010, ApSS, 328, 179)

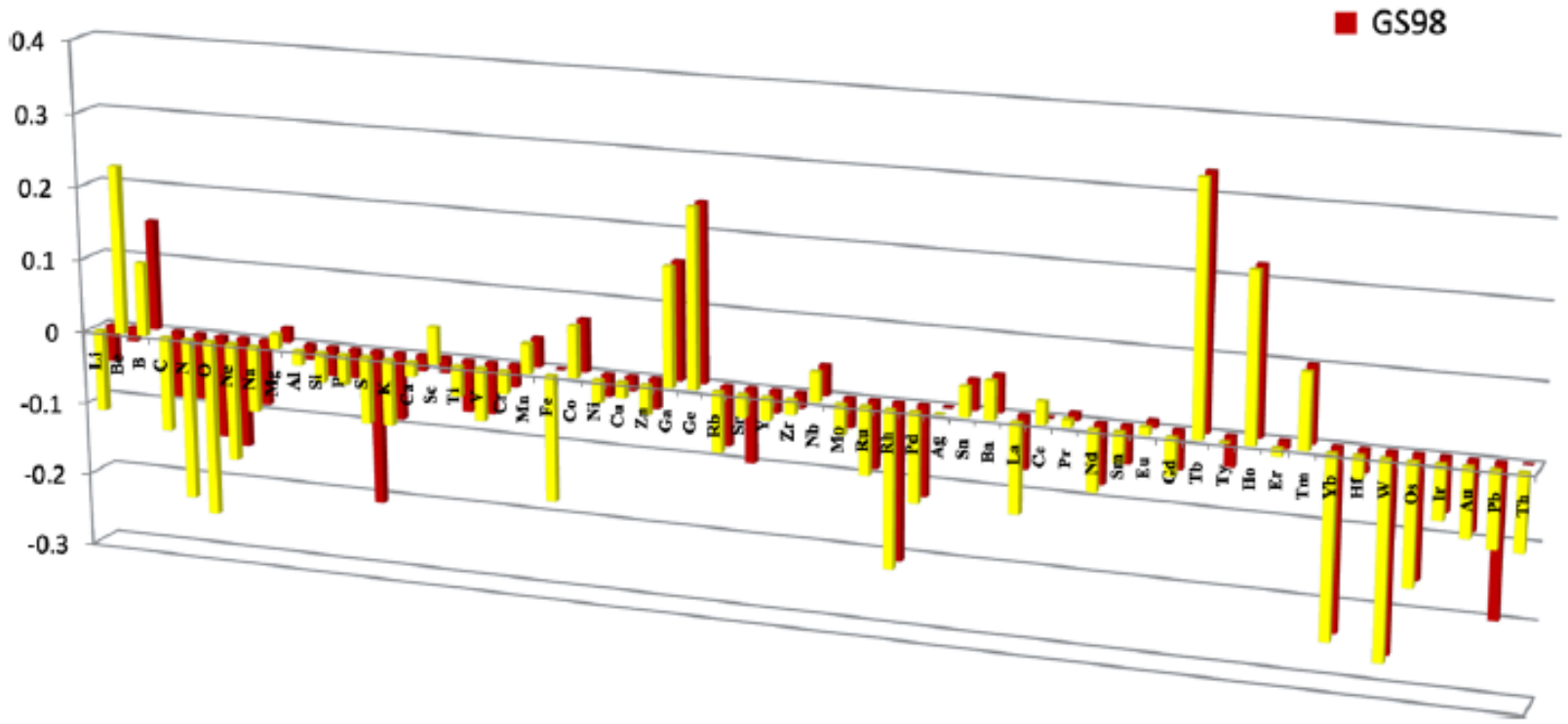

Fig. 1 Comparison of the present photospheric results with those of Anders and Grevesse (1989) (AG89) and Grevesse and Sauval (1998) (GS98). Plotted are the differences (this work—AG89) and (this work—GS98)

Photosphere − meteorite

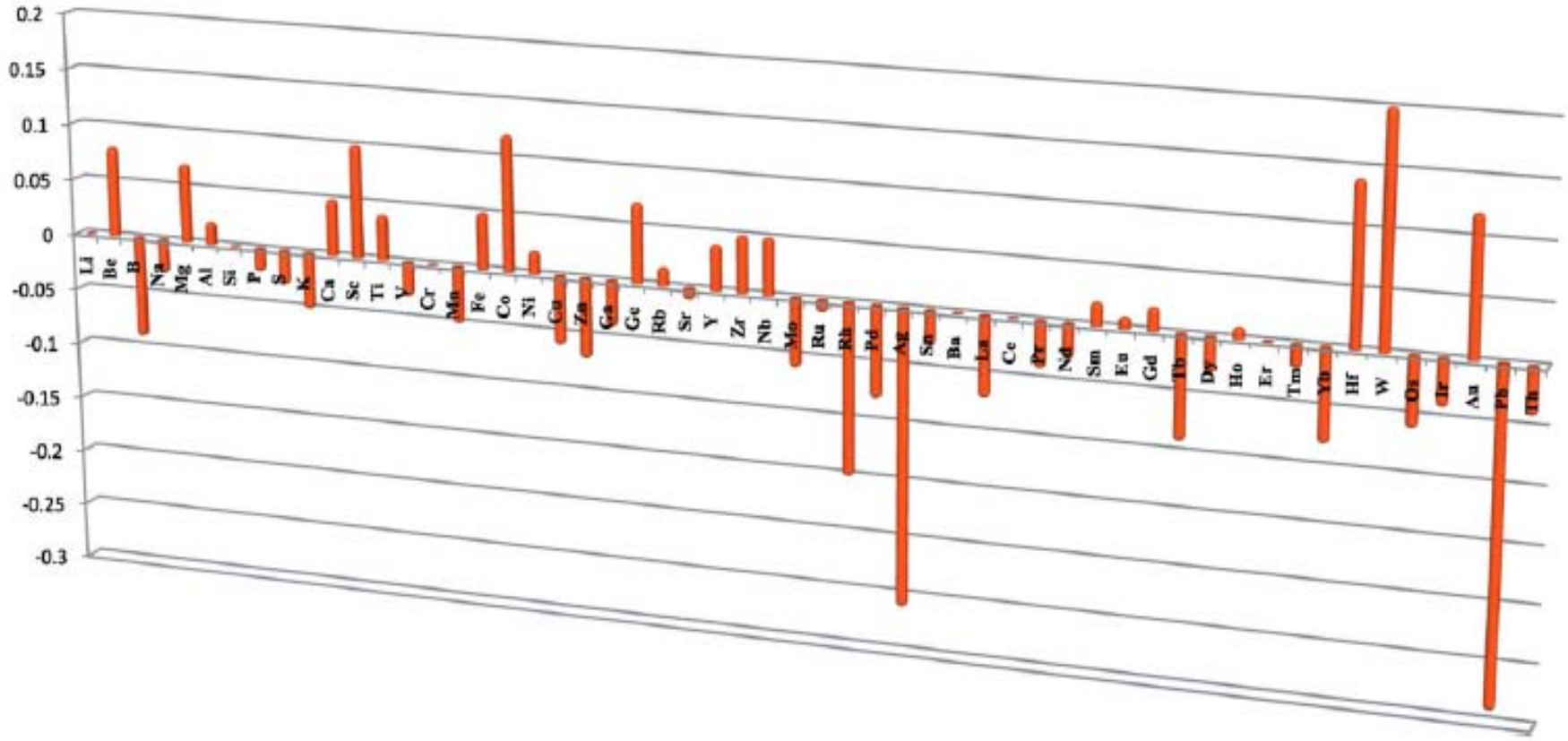

Fig. 2 Differences between our photospheric results and the meteoritic abundances from Lodders et al. (2009)

太陽光球大気の観測値が無い主な元素

33	As		2.30 ± 0.04
34	Se		3.34 ± 0.03
35	Br		2.54 ± 0.06
48	Cd		1.71 ± 0.03
49	In	0.80 ± 0.20	0.76 ± 0.03
50	Sn	2.04 ± 0.10	2.07 ± 0.06
51	Sb		1.01 ± 0.06
52	Te		2.18 ± 0.03
53	I		1.55 ± 0.08
54	Xe	$[2.24 \pm 0.06]$	-1.95
55	Cs		1.08 ± 0.02
73	Ta		-0.12 ± 0.04
74	W	0.85 ± 0.12	0.65 ± 0.04
75	Re		0.26 ± 0.04
76	Os	1.40 ± 0.08	1.35 ± 0.03
77	Ir	1.38 ± 0.07	1.32 ± 0.02
78	Pt		1.62 ± 0.03
79	Au	0.92 ± 0.10	0.80 ± 0.04
80	Hg		1.17 ± 0.08
81	Tl	0.90 ± 0.20	0.77 ± 0.03
82	Pb	1.75 ± 0.10	2.04 ± 0.03
83	Bi		0.65 ± 0.04
90	Th	0.02 ± 0.10	0.06 ± 0.03
92	U		-0.54 ± 0.03

光球スペクトル以外の決定

Noble gases--- no photospheric lines due to high excitation potential

He: helioseismology

Ne: X, UV spectroscopy of solar corona and flare ; solar wind

Ar: solar wind, flare, Jupiter, B stars, planetary nebulae, HII region etc.

Kr, Xe: s-process production rates (interpolated).

太陽光球大気の観測値が無い主な元素

33	As		2.30 ± 0.04
34	Se		3.34 ± 0.03
35	Br		2.54 ± 0.06
48	Cd		1.71 ± 0.03
49	In	0.80 ± 0.20	0.76 ± 0.03
50	Sn	2.04 ± 0.10	2.07 ± 0.06
51	Sb		1.01 ± 0.06
52	Te		2.18 ± 0.03
53	I		1.55 ± 0.08
54	Xe	$[2.24 \pm 0.06]$	-1.95
55	Cs		1.08 ± 0.02
73	Ta		-0.12 ± 0.04
74	W	0.85 ± 0.12	0.65 ± 0.04
75	Re		0.26 ± 0.04
76	Os	1.40 ± 0.08	1.35 ± 0.03
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78	Pt		1.62 ± 0.03
79	Au	0.92 ± 0.10	0.80 ± 0.04
80	Hg		1.17 ± 0.08
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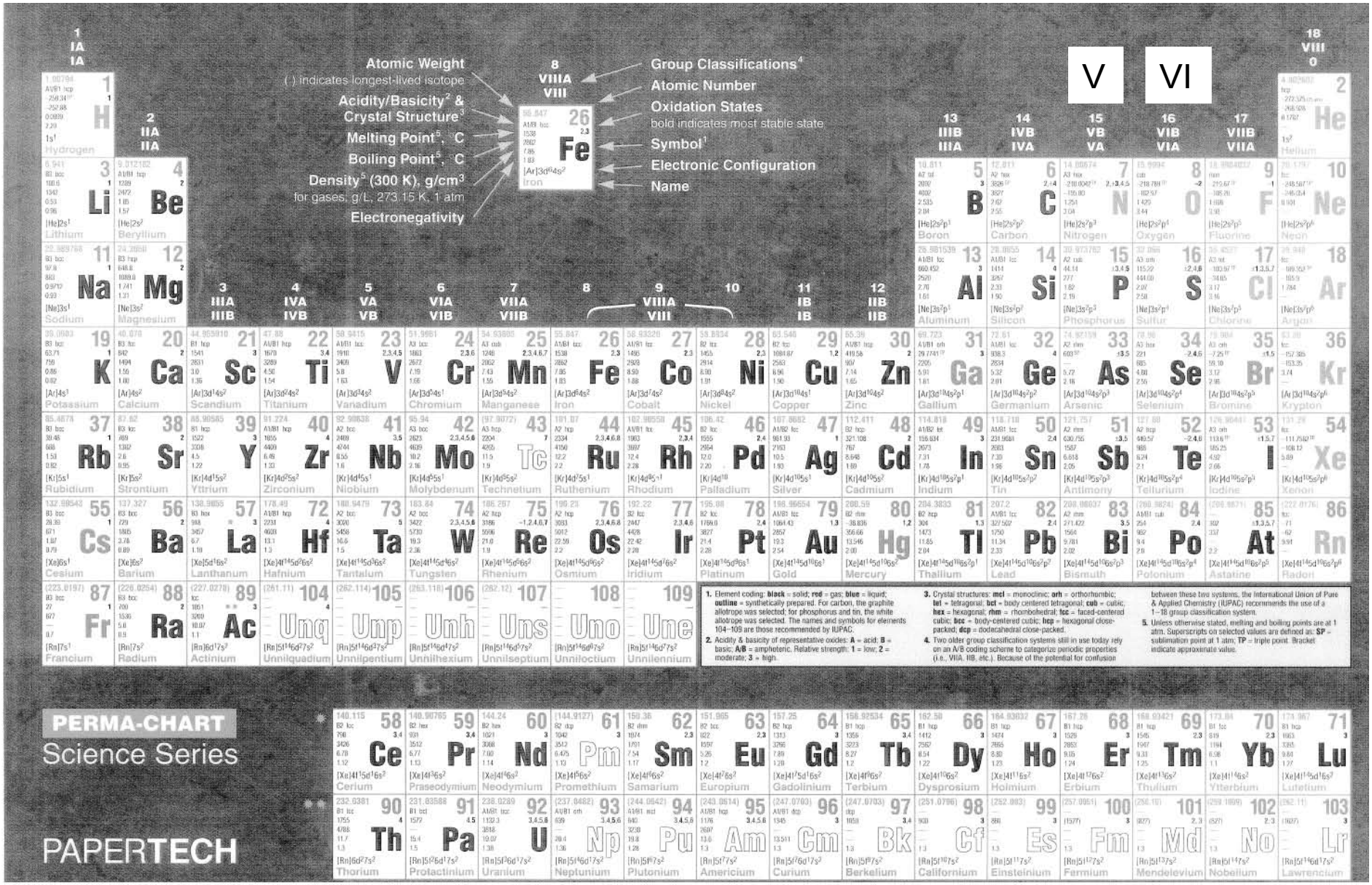
83	Bi		0.65 ± 0.04
90	Th	0.02 ± 0.10	0.06 ± 0.03
92	U		-0.54 ± 0.03


Atomic Weight
( ) indicates longest-lived isotope
Acidity/Basicity[2] & Crystal Structure[3]
Melting Point[5], °C
Boiling Point[5], °C
Density[5] (300 K), g/cm³
for gases, g/L, 273.15 K, 1 atm
Electronegativity
Group Classifications[4]
Atomic Number
Oxidation States
bold indicates most stable state
Symbol[1]
Electronic Configuration
Name
V
VI
1 IA IA
2 IIA IIA
3 IIIA IIIB
4 IVA IVB
5 VA VB
6 VIA VIB
7 VIIA VIIB
8
9 VIIIA VIII
10
11 IB IB
12 IIB IIB
13 IIIB IIIA
14 IVB IVA
15 VB VA
16 VIB VIA
17 VIIB VIIA
18 VIII 0
1 H Hydrogen
2 He Helium
3 Li Lithium
4 Be Beryllium
5 B Boron
6 C Carbon
7 N Nitrogen
8 O Oxygen
9 F Fluorine
10 Ne Neon
11 Na Sodium
12 Mg Magnesium
13 Al Aluminum
14 Si Silicon
15 P Phosphorus
16 S Sulfur
17 Cl Chlorine
18 Ar Argon
19 K Potassium
20 Ca Calcium
21 Sc Scandium
22 Ti Titanium
23 V Vanadium
24 Cr Chromium
25 Mn Manganese
26 Fe Iron
27 Co Cobalt
28 Ni Nickel
29 Cu Copper
30 Zn Zinc
31 Ga Gallium
32 Ge Germanium
33 As Arsenic
34 Se Selenium
35 Br Bromine
36 Kr Krypton
37 Rb Rubidium
38 Sr Strontium
39 Y Yttrium
40 Zr Zirconium
41 Nb Niobium
42 Mo Molybdenum
43 Tc Technetium
44 Ru Ruthenium
45 Rh Rhodium
46 Pd Palladium
47 Ag Silver
48 Cd Cadmium
49 In Indium
50 Sn Tin
51 Sb Antimony
52 Te Tellurium
53 I Iodine
54 Xe Xenon
55 Cs Cesium
56 Ba Barium
57 La Lanthanum
72 Hf Hafnium
73 Ta Tantalum
74 W Tungsten
75 Re Rhenium
76 Os Osmium
77 Ir Iridium
78 Pt Platinum
79 Au Gold
80 Hg Mercury
81 Tl Thallium
82 Pb Lead
83 Bi Bismuth
84 Po Polonium
85 At Astatine
86 Rn Radon
87 Fr Francium
88 Ra Radium
89 Ac Actinium
104 Unq Unnilquadium
105 Unp Unnilpentium
106 Unh Unnilhexium
107 Uns Unnilseptium
108 Uno Unniloctium
109 Une Unnilennium
58 Ce Cerium
59 Pr Praseodymium
60 Nd Neodymium
61 Pm Promethium
62 Sm Samarium
63 Eu Europium
64 Gd Gadolinium
65 Tb Terbium
66 Dy Dysprosium
67 Ho Holmium
68 Er Erbium
69 Tm Thulium
70 Yb Ytterbium
71 Lu Lutetium
90 Th Thorium
91 Pa Protactinium
92 U Uranium
93 Np Neptunium
94 Pu Plutonium
95 Am Americium
96 Cm Curium
97 Bk Berkelium
98 Cf Californium
99 Es Einsteinium
100 Fm Fermium
101 Md Mendelevium
102 No Nobelium
103 Lr Lawrencium
1. Element coding: black = solid; red = gas; blue = liquid; outline = synthetically prepared. For carbon, the graphite allotrope was selected; for phosphorus and tin, the white allotrope was selected. The names and symbols for elements 104–109 are those recommended by IUPAC.
2. Acidity & basicity of representative oxides: A = acid; B = basic; A/B = amphoteric. Relative strength: 1 = low; 2 = moderate; 3 = high.
3. Crystal structures: mcl = monoclinic; orh = orthorhombic; tet = tetragonal; bct = body centered tetragonal; cub = cubic; hex = hexagonal; rhm = rhombohedral; fcc = faced-centered cubic; bcc = body-centered cubic; hcp = hexagonal close-packed; dcp = dodecahedral close-packed.
4. Two older group classification systems still in use today rely on an A/B coding scheme to categorize periodic properties (i.e., VIIA, IIB, etc.). Because of the potential for confusion between these two systems, the International Union of Pure & Applied Chemistry (IUPAC) recommends the use of a 1–18 group classification system.
5. Unless otherwise stated, melting and boiling points are at 1 atm. Superscripts on selected values are defined as: SP = sublimation point at 1 atm; TP = triple point. Bracket indicate approximate value.
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2. 吸収線の探索

スペクトルデータ:

- Kurucz + (1984; Solar Flux Atlas from296 to 1300 nm)
- Moore +(1966; The Solar Spectrum 2935 A to 8770 A)
- Swensson + (1970; The Solar Spectrum from 7498 to 12016 A)

理論スペクトル:

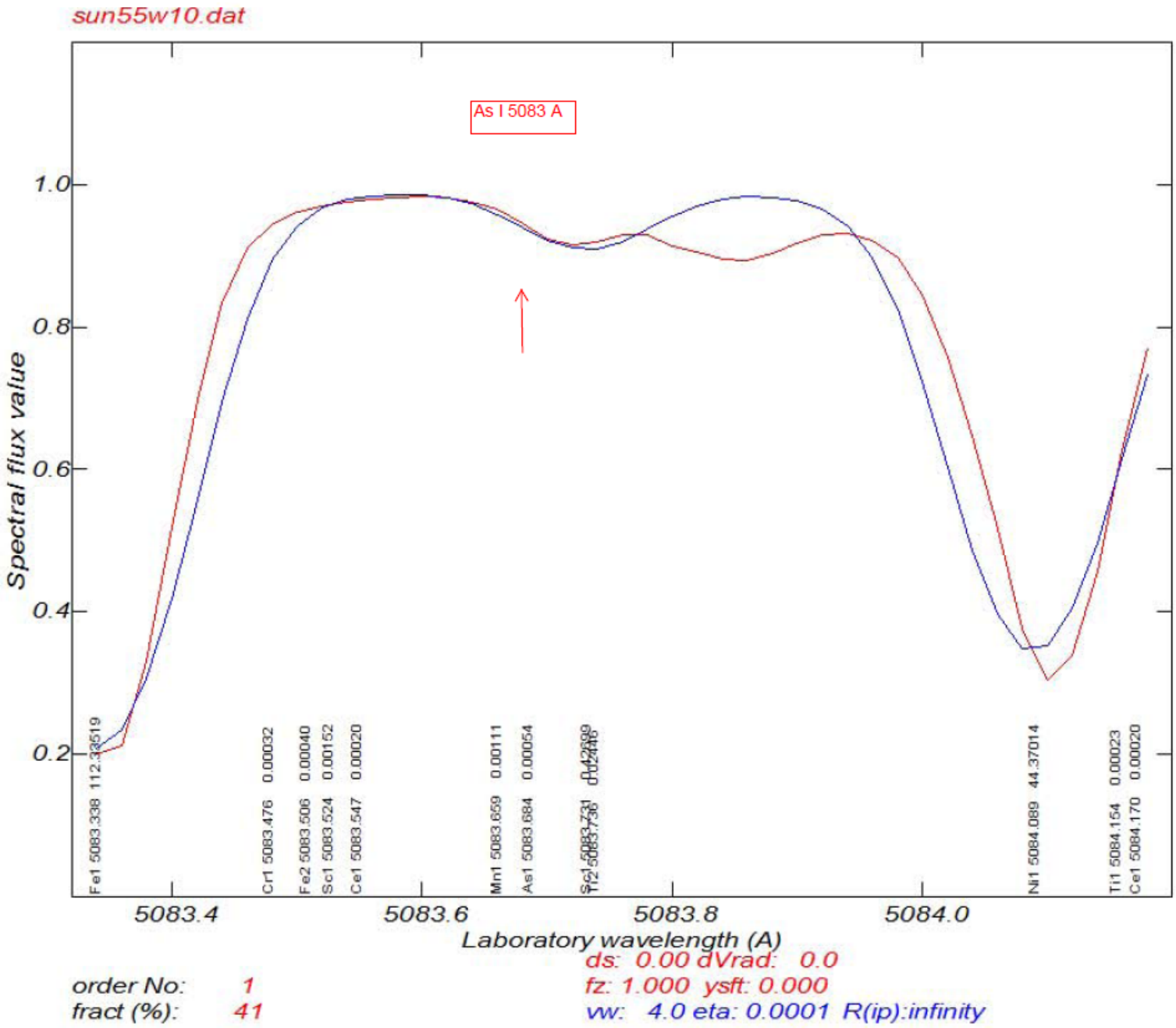
SPTOOL （竹田氏制作）

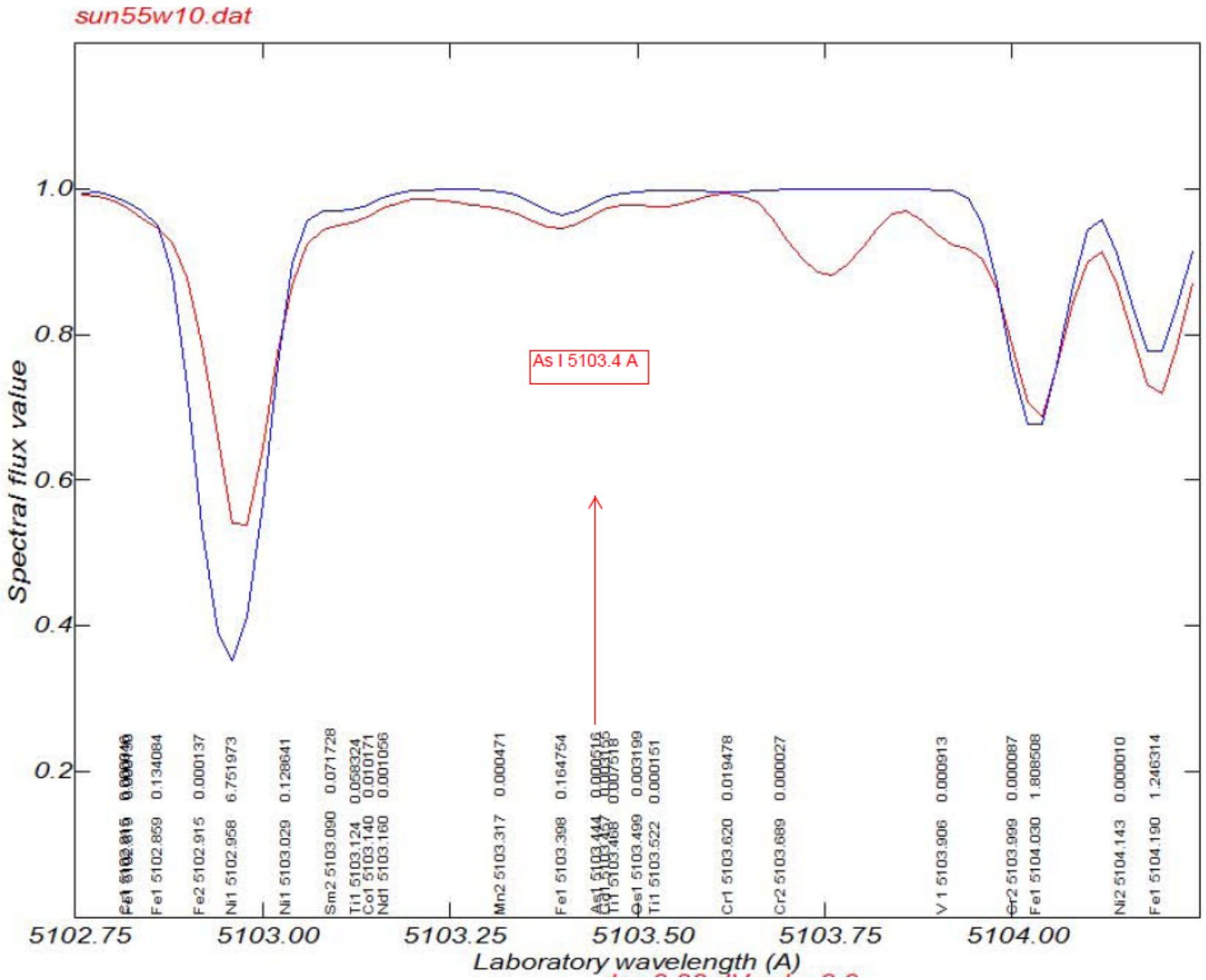
Kurucz(1993 ; CD Rom) : λ、gf values （利用可能な場合）

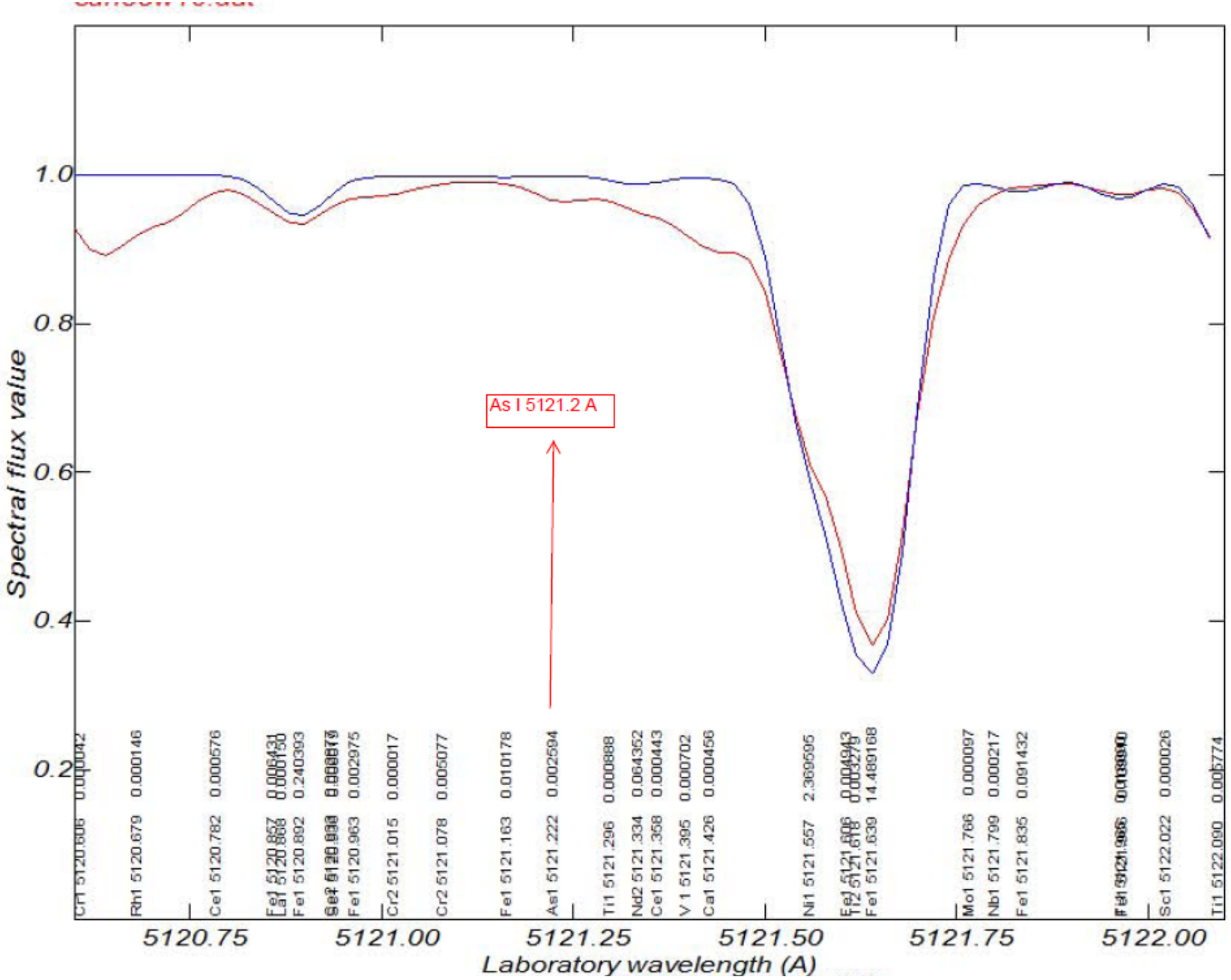
（1）砒素の探査

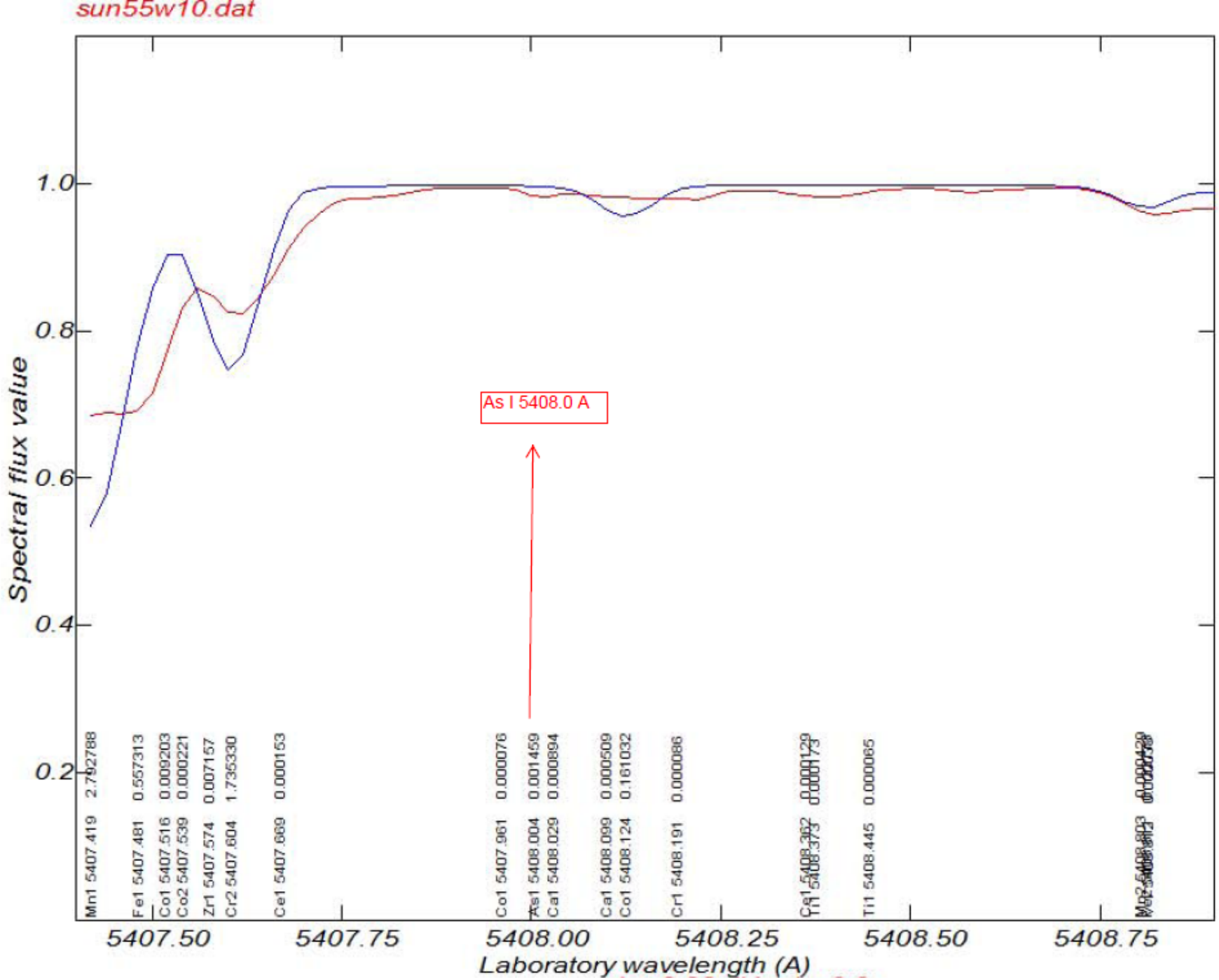
吸収線リスト（Kurucz)
As　I （中性砒素）

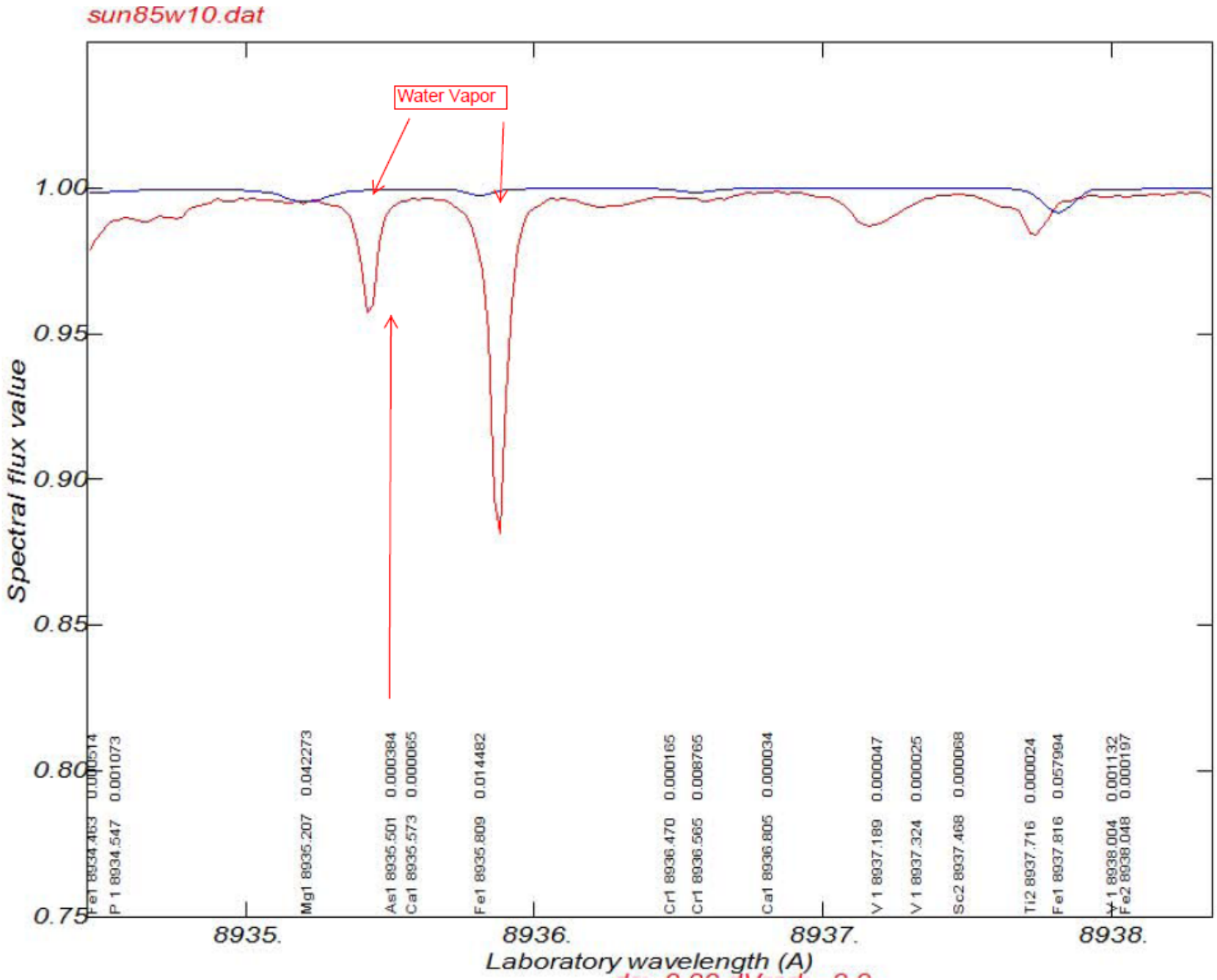
wavelength	log gf
303.2846	-0.45
307.5313	-1
311.9587	-0.78
491.0119	-0.2
495.2514	-0.3
498.7034	-0.2
499.5776	-0.4
504.3242	0.2
506.8975	0.5
508.3684	0
509.9471	0.5
510.3444	-0.2
512.1222	0.5
513.0686	0.5
514.1562	0.4
519.6152	0.2
521.0136	-0.2
521.2106	-0.2
536.3375	0.2
540.8004	0.4
545.1353	0.4
633.8892	0
882.1704	0
886.9631	0
893.5501	-0.2


sun55w10.dat
As I 5083 A
1.0
0.8
0.6
0.4
0.2
Spectral flux value
Fe1 5083.338 112.33519
Cr1 5083.476 0.00032
Fe2 5083.506 0.00040
Sc1 5083.524 0.00152
Ce1 5083.547 0.00020
Mn1 5083.659 0.00111
As1 5083.684 0.00054
Ni1 5084.089 44.37014
Ti1 5084.154 0.00023
Ce1 5084.170 0.00020
5083.4
5083.6
5083.8
5084.0
Laboratory wavelength (A)
ds: 0.00 dVrad: 0.0
fz: 1.000 ysft: 0.000
vw: 4.0 eta: 0.0001 R(ip):infinity
order No: 1
fract (%): 41


sun55w10.dat
As I 5103.4 A
Spectral flux value
1.0
0.8
0.6
0.4
0.2
5102.75
5103.00
5103.25
5103.50
5103.75
5104.00
Laboratory wavelength (A)
Fe1 5102.859 0.134084
Fe2 5102.915 0.000137
Ni1 5102.958 6.751973
Ni1 5103.029 0.128641
Sm2 5103.090 0.071728
Ti1 5103.124 0.058324
Co1 5103.140 0.010171
Nd1 5103.160 0.001056
Mn2 5103.317 0.000471
Fe1 5103.398 0.164754
Os1 5103.499 0.003199
Ti1 5103.522 0.000151
Cr1 5103.620 0.019478
Cr2 5103.689 0.000027
V 1 5103.906 0.000913
Cr2 5103.999 0.000087
Fe1 5104.030 1.808508
Ni2 5104.143 0.000010
Fe1 5104.190 1.246314


1.0
0.8
0.6
0.4
0.2
Spectral flux value
As I 5121.2 A
5120.75
5121.00
5121.25
5121.50
5121.75
5122.00
Laboratory wavelength (A)


sun55w10.dat
1.0
0.8
0.6
0.4
0.2
Spectral flux value
As I 5408.0 A
Mn1 5407.419 2.792788
Fe1 5407.481 0.557313
Co1 5407.516 0.009203
Co2 5407.539 0.000221
Zr1 5407.574 0.007157
Cr2 5407.604 1.735330
Ce1 5407.669 0.000153
Co1 5407.961 0.000076
As1 5408.004 0.001459
Ca1 5408.029 0.000894
Ca1 5408.099 0.000509
Co1 5408.124 0.161032
Cr1 5408.191 0.000086
Ce1 5408.362 0.000129
Ti1 5408.373 0.000173
Ti1 5408.445 0.000065
5407.50
5407.75
5408.00
5408.25
5408.50
5408.75
Laboratory wavelength (A)


sun85w10.dat
Water Vapor
1.00
0.95
0.90
0.85
0.80
0.75
Spectral flux value
8935.
8936.
8937.
8938.
Laboratory wavelength (A)
Fe1 8934.463 0.000514
P 1 8934.547 0.001073
Mg1 8935.207 0.042273
As1 8935.501 0.000384
Ca1 8935.573 0.000065
Fe1 8935.809 0.014482
Cr1 8936.470 0.000165
Cr1 8936.565 0.008765
Ca1 8936.805 0.000034
V 1 8937.189 0.000047
V 1 8937.324 0.000025
Sc2 8937.468 0.000068
Ti2 8937.716 0.000024
Fe1 8937.816 0.057994
Y 1 8938.004 0.001132
Fe2 8938.048 0.000197

As　組成解析　　log As=2.30

5083.684	6.588	0	0	0	0	6.4	1	5.25
5103.444	6.399	−0.2	0	0	0	4.7	1	5.14
5121.222	6.399	0.5	0	0	0	2.1	1	4.07
5408.004	6.588	0.4	0	0	0	0.6	1	3.78

結果:
５１２１　と　５４０８　Ａ　の吸収線が候補の可能性がある。
⇒　さらなる解析の必要。

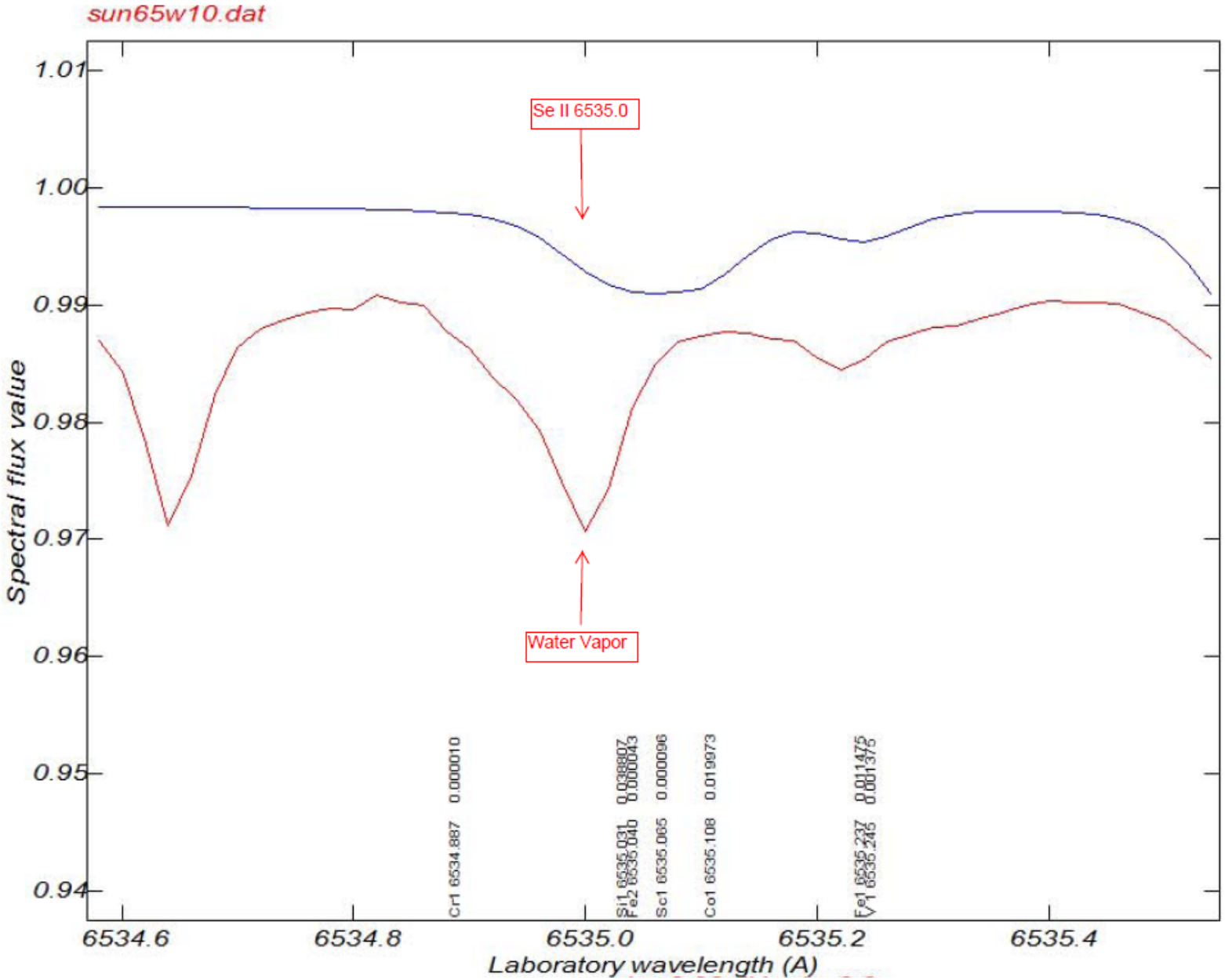
（2）セレンの探査 (Se I と 主なSe II)

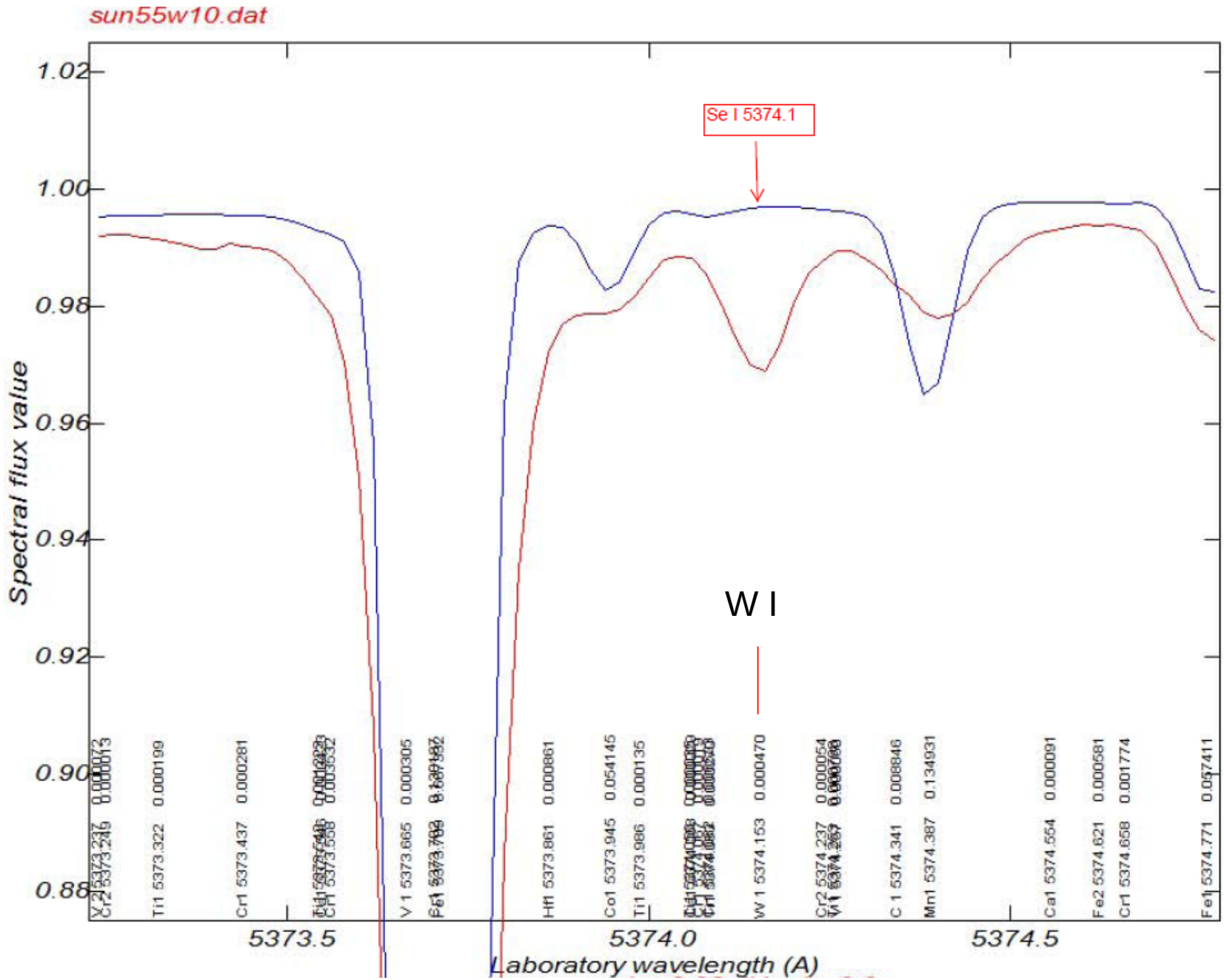
吸収線リスト （NIST)

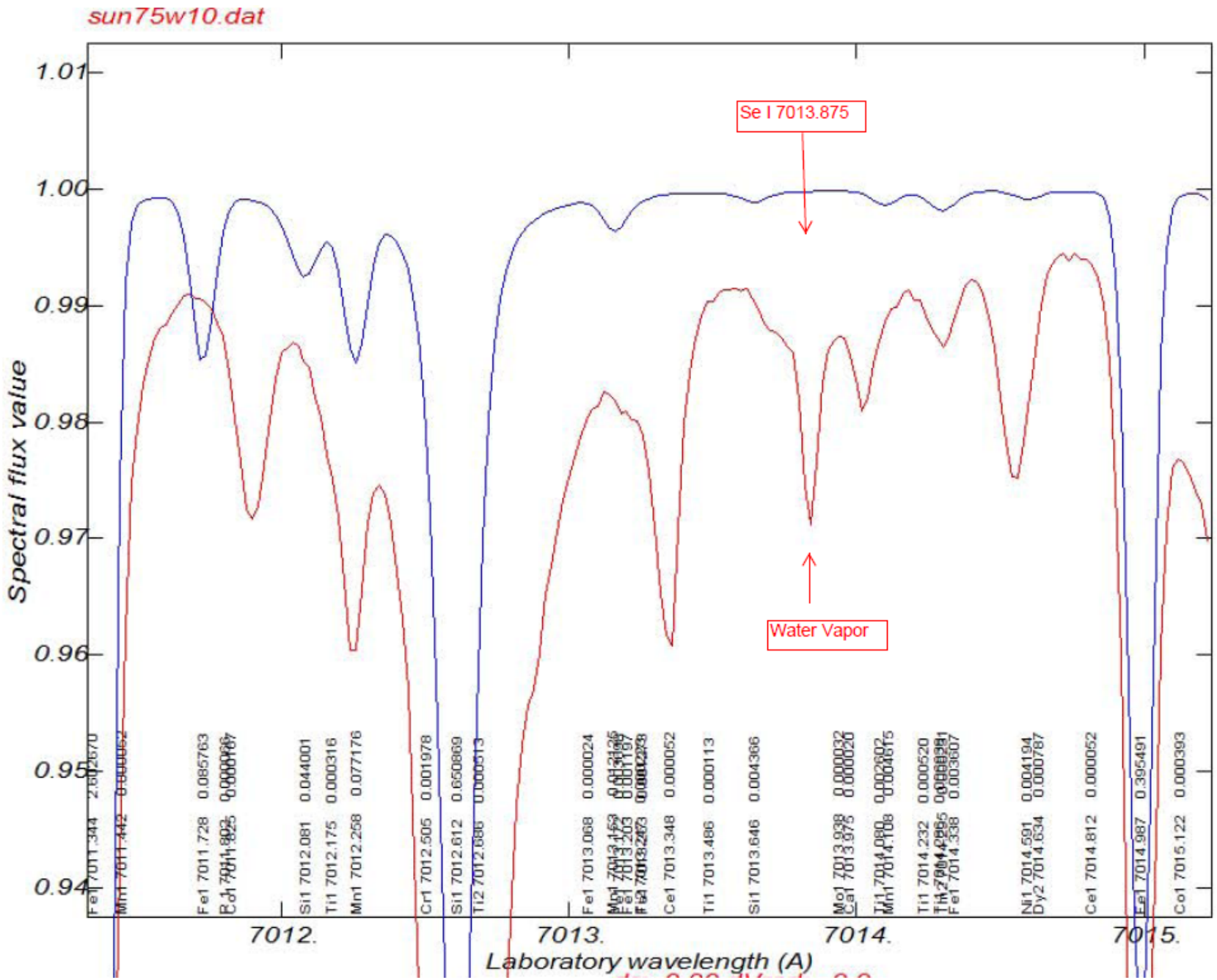
	波長	強度
Se I	4328.7	120
	4330.3	100
	4730.8	500
	4739.0	400
	4742.2	300
	5365.5	100
	5369.9	120
	5374.1	110
	6325.6	200
	6831.3	150
	6990.690	120
	6991.792	100
	7010.809	200
	7013.875	150
	7062.065	300
	7575.1	200
	7583.4	250
	7592.2	150
	7606.8	120
	8001.0	300
	8036.4	200
	8060.9	120
	8065.3	120
	8081.1	120
	8093.2	150
	8094.7	150
	8149.3	180
	8152.0	150
	8157.7	200
	8163.1	180
	8182.9	150
	8185.0	100
	8194.6	120
	8440.47	150
	8450.38	150
	8742.33	150
	8918.86	300
	8969.69	100
Se II		
	5227.5	450
	5305.4	360
	6056.0	450
	6444.2	360
	6535.0	285

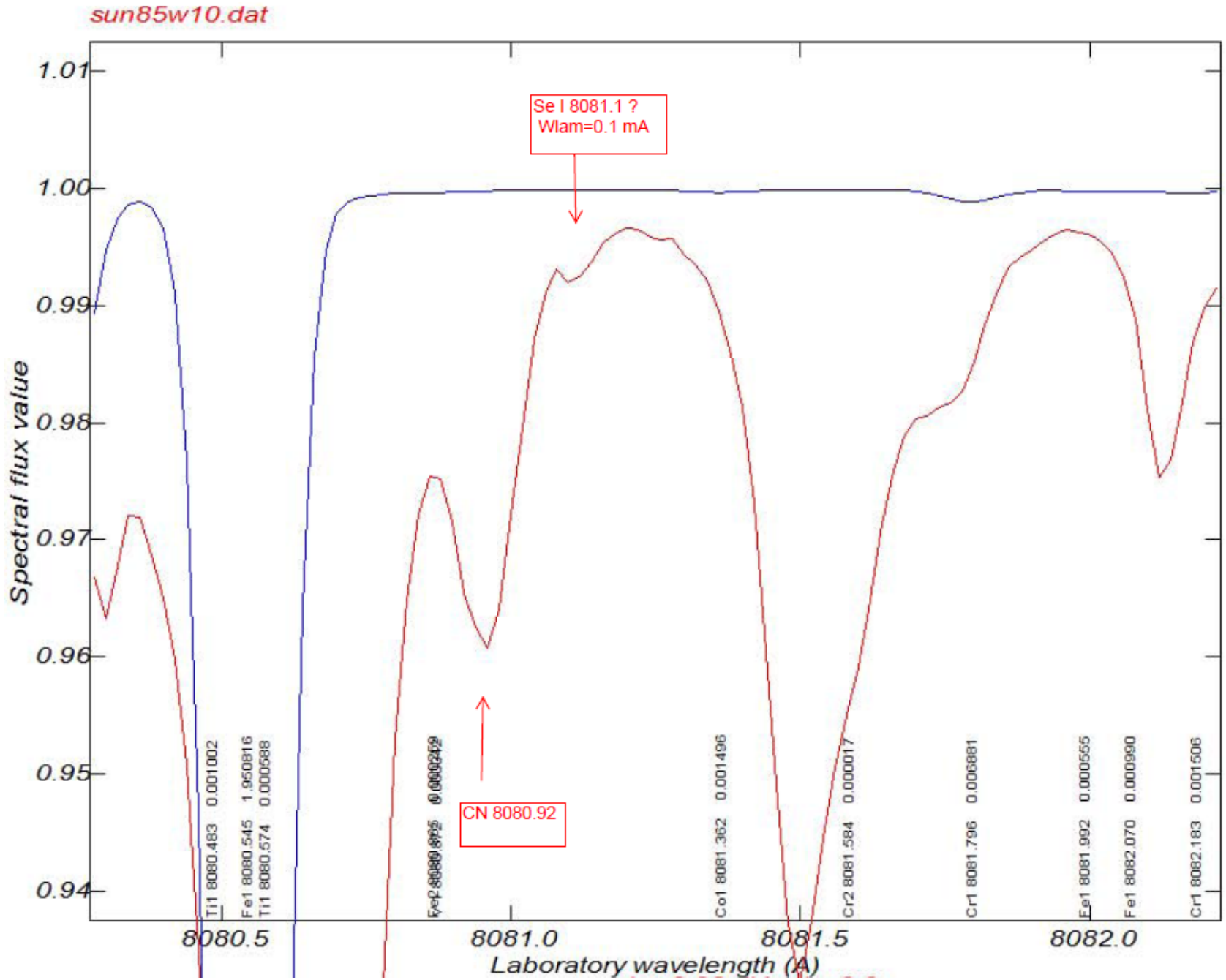
Kurucz gf values:

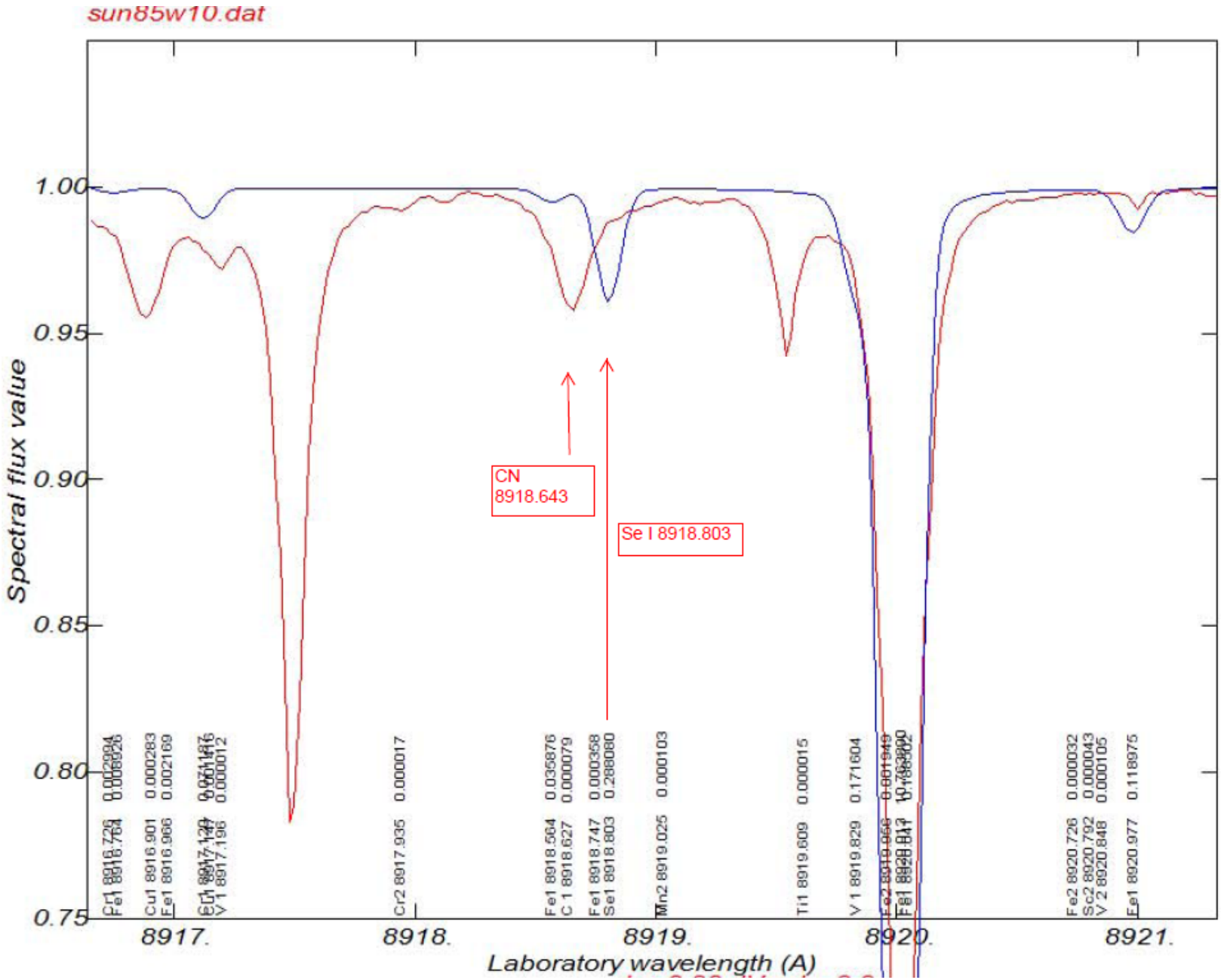
	wavelength	chi	log gf			
34.00	8918.803	5.974	+1.290	0.00	0.00	0.00
34.00	9001.898	5.974	+0.000	0.00	0.00	0.00
34.00	9038.546	5.974	+0.000	0.00	0.00	0.00

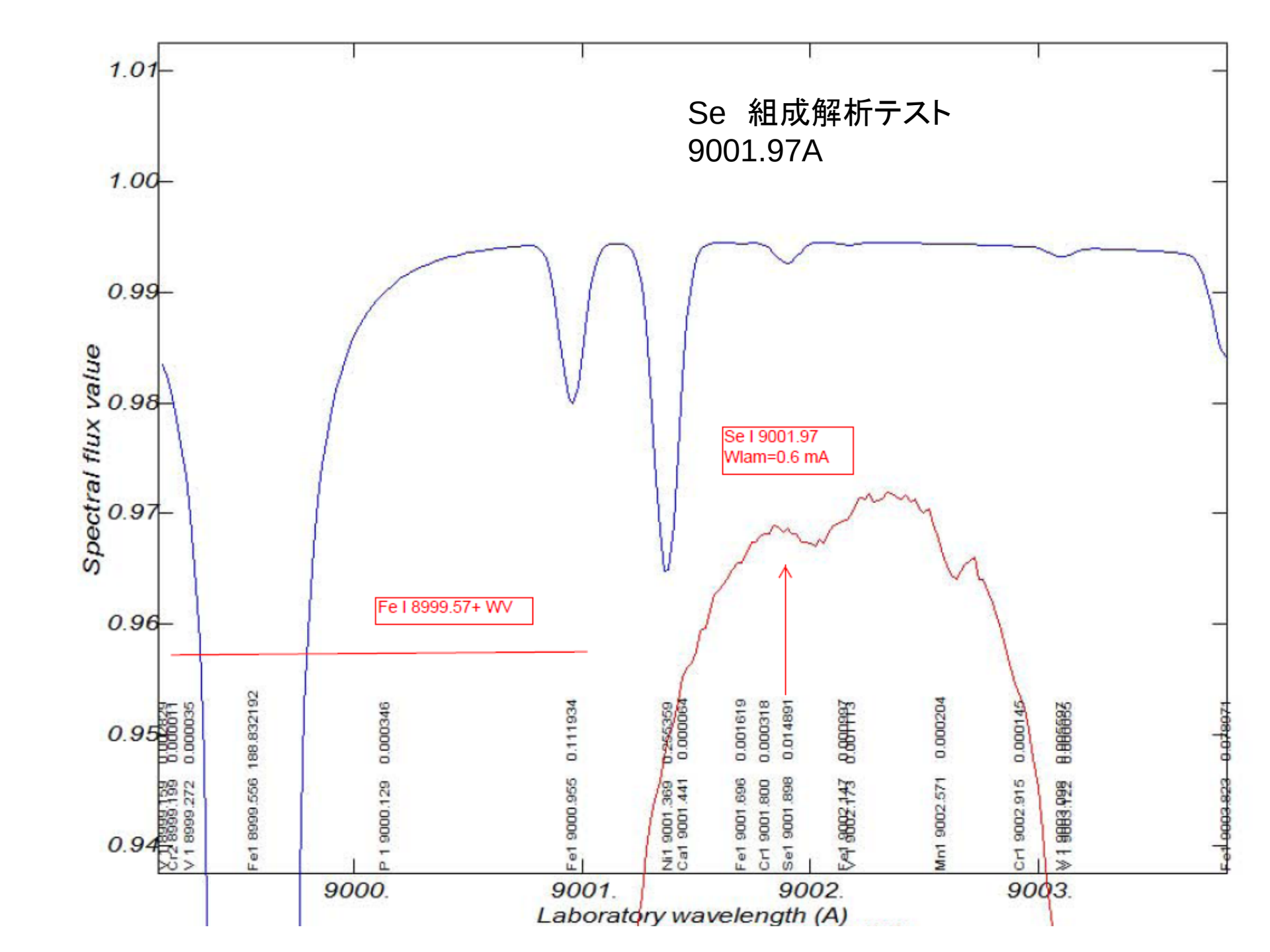

sun65w10.dat
Se II 6535.0
Water Vapor
Spectral flux value
Laboratory wavelength (A)
1.01
1.00
0.99
0.98
0.97
0.96
0.95
0.94
6534.6
6534.8
6535.0
6535.2
6535.4
Cr1 6534.887 0.000010
Si1 6535.031 0.038807
Fe2 6535.040 0.000043
Sc1 6535.065 0.000096
Co1 6535.108 0.019973
Fe1 6535.237 0.011475
V 1 6535.245 0.001375

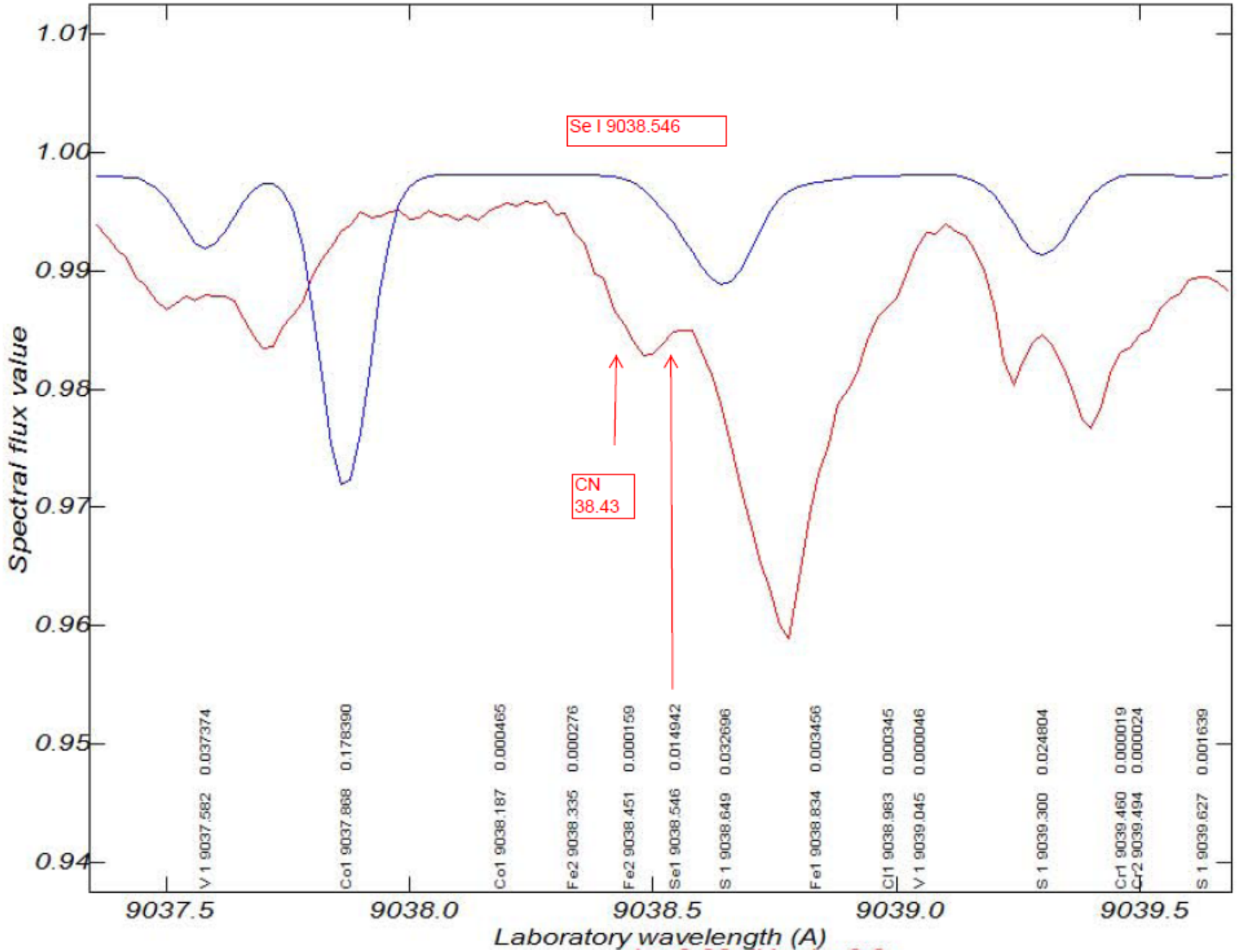

sun55w10.dat
Se I 5374.1
W I
Spectral flux value
1.02
1.00
0.98
0.96
0.94
0.92
0.90
0.88
5373.5
5374.0
5374.5
Laboratory wavelength (A)
Ti1 5373.322 0.000199
Cr1 5373.437 0.000281
V 1 5373.665 0.000305
Hf1 5373.861 0.000861
Co1 5373.945 0.054145
Ti1 5373.986 0.000135
W 1 5374.153 0.000470
C 1 5374.341 0.008846
Mn1 5374.387 0.134931
Ca1 5374.554 0.000091
Fe2 5374.621 0.000581
Cr1 5374.658 0.001774
Fe1 5374.771 0.057411

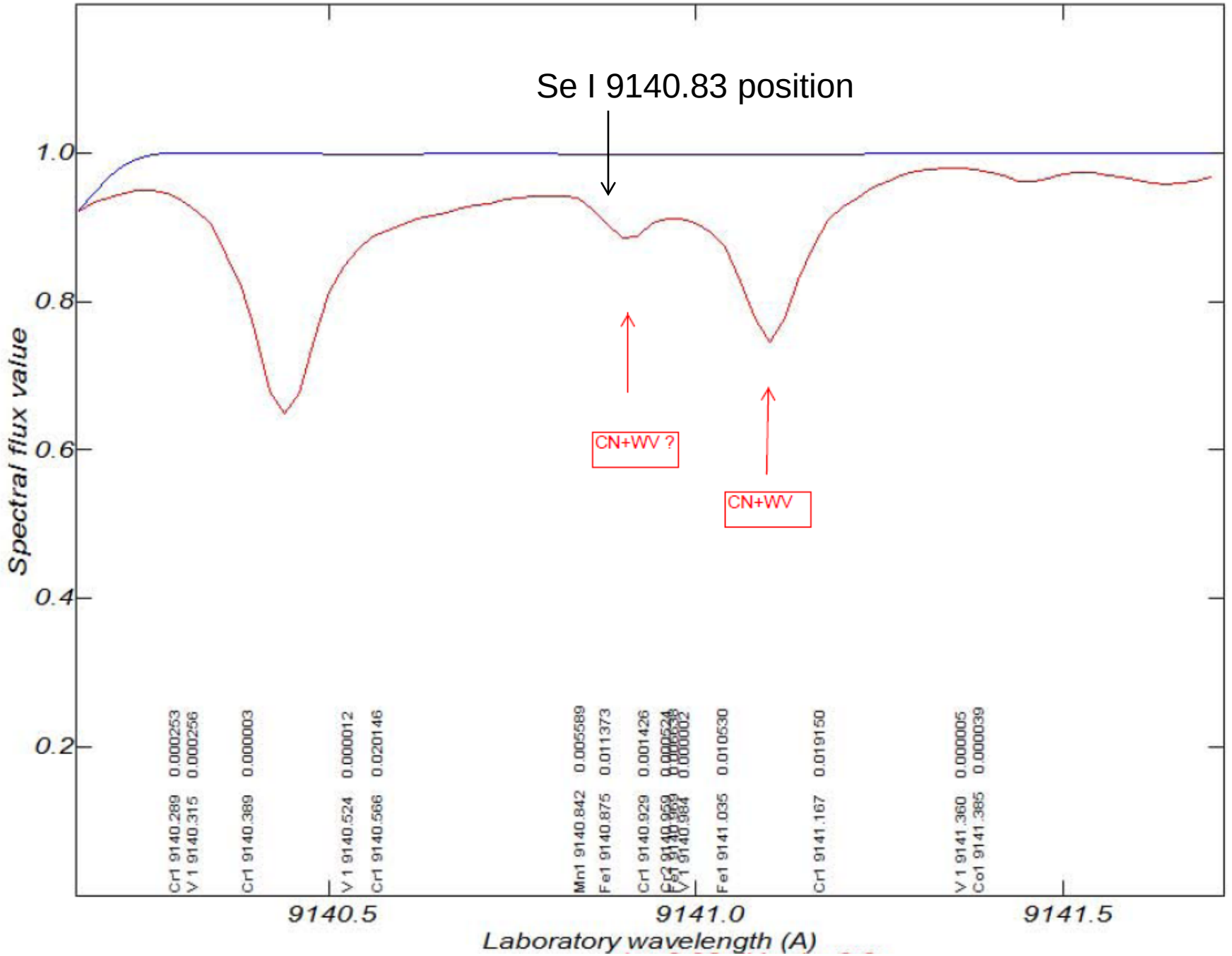

sun75w10.dat
Se I 7013.875
Water Vapor
Spectral flux value
1.01
1.00
0.99
0.98
0.97
0.96
0.95
0.94
7012.
7013.
7014.
7015.
Laboratory wavelength (A)
Fe1 7011.344 2.602670
Mn1 7011.442 0.000062
Fe1 7011.728 0.085763
Si1 7012.081 0.044001
Ti1 7012.175 0.000316
Mn1 7012.258 0.077176
Cr1 7012.505 0.001978
Si1 7012.612 0.650869
Ti2 7012.686 0.000513
Fe1 7013.068 0.000024
Ce1 7013.348 0.000052
Ti1 7013.486 0.000113
Si1 7013.646 0.004366
Mo1 7013.938 0.000032
Ca1 7013.975 0.000026
Ti1 7014.232 0.000520
Fe1 7014.338 0.003607
Ni1 7014.591 0.004194
Dy2 7014.634 0.000787
Ce1 7014.812 0.000052
Fe1 7014.987 0.395491
Co1 7015.122 0.000393

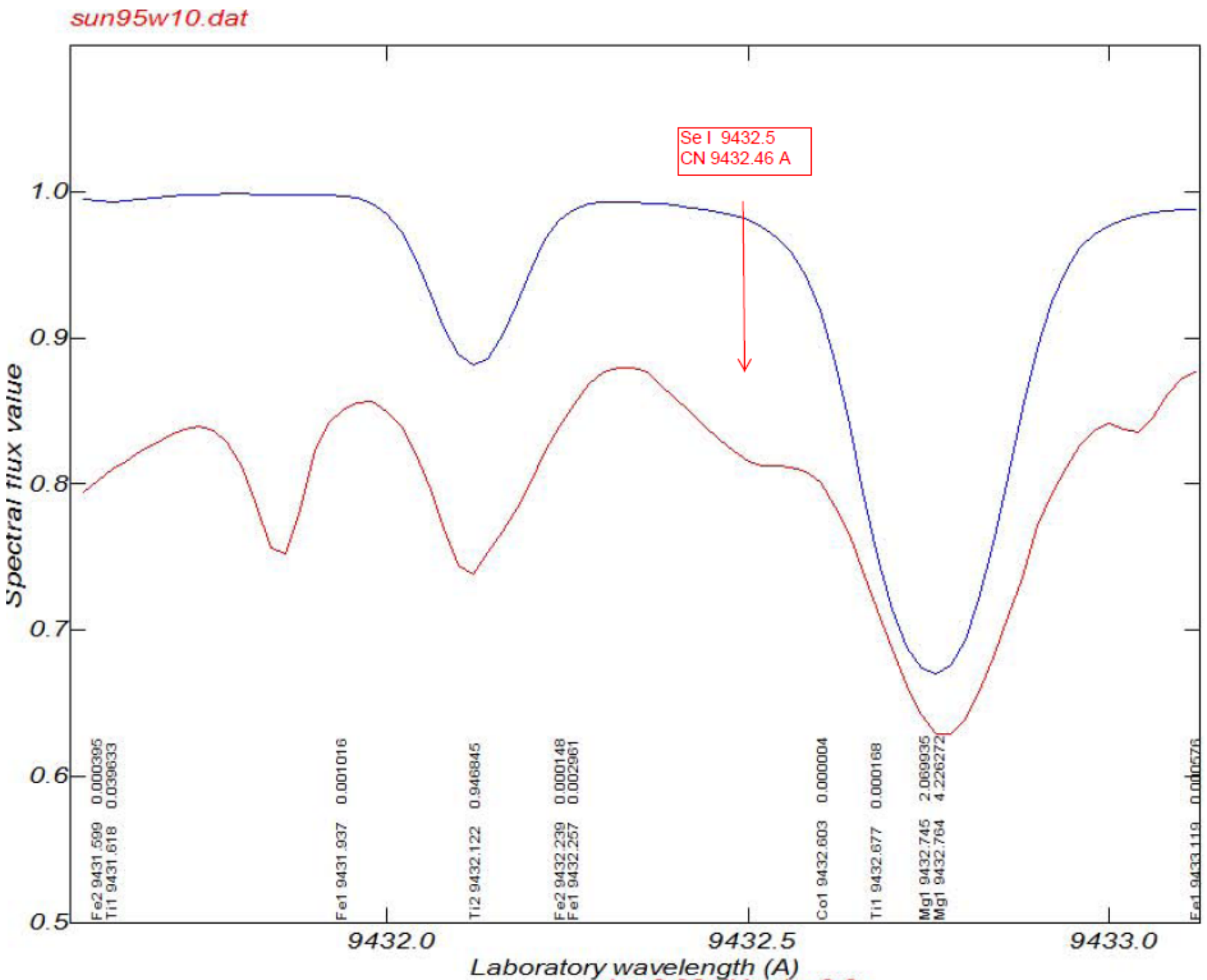

sun85w10.dat
Se I 8081.1 ?
Wlam=0.1 mA
CN 8080.92
Spectral flux value
Laboratory wavelength (A)
1.01
1.00
0.99
0.98
0.97
0.96
0.95
0.94
8080.5
8081.0
8081.5
8082.0
Ti1 8080.483 0.001002
Fe1 8080.545 1.950816
Ti1 8080.574 0.000588
Co1 8081.362 0.001496
Cr2 8081.584 0.000017
Cr1 8081.796 0.006881
Fe1 8081.992 0.000555
Fe1 8082.070 0.000990
Cr1 8082.183 0.001506


sun85w10.dat
1.00
0.95
0.90
0.85
0.80
0.75
Spectral flux value
CN
8918.643
Se I 8918.803
8917.
8918.
8919.
8920.
8921.
Laboratory wavelength (A)


Se 組成解析テスト
9001.97A
Se I 9001.97
Wlam=0.6 mA
Fe I 8999.57+ WV
Spectral flux value
1.01
1.00
0.99
0.98
0.97
0.96
0.95
0.94
9000.
9001.
9002.
9003.
Laboratory wavelength (A)
Fe1 8999.556 188.832192
P 1 9000.129 0.000346
Fe1 9000.955 0.111934
Ni1 9001.369
Ca1 9001.441 0.000064
Fe1 9001.696 0.001619
Cr1 9001.800 0.000318
Se1 9001.898 0.014891
Mn1 9002.571 0.000204
Cr1 9002.915 0.000145


Se I 9038.546
CN
38.43
Spectral flux value
1.01
1.00
0.99
0.98
0.97
0.96
0.95
0.94
V 1 9037.582 0.037374
Co1 9037.868 0.178390
Co1 9038.187 0.000465
Fe2 9038.335 0.000276
Fe2 9038.451 0.000159
Se1 9038.546 0.014942
S 1 9038.649 0.032696
Fe1 9038.834 0.003456
Cl1 9038.983 0.000345
V 1 9039.045 0.000046
S 1 9039.300 0.024804
Cr1 9039.460 0.000019
Cr2 9039.494 0.000024
S 1 9039.627 0.001639
9037.5
9038.0
9038.5
9039.0
9039.5
Laboratory wavelength (A)


Se I 9140.83 position
CN+WV ?
CN+WV
Spectral flux value
1.0
0.8
0.6
0.4
0.2
9140.5
9141.0
9141.5
Laboratory wavelength (A)
Cr1 9140.289 0.000253
V 1 9140.315 0.000256
Cr1 9140.389 0.000003
V 1 9140.524 0.000012
Cr1 9140.566 0.020146
Mn1 9140.842 0.005589
Fe1 9140.875 0.011373
Cr1 9140.929 0.001426
Fe1 9141.035 0.010530
Cr1 9141.167 0.019150
V 1 9141.360 0.000005
Co1 9141.385 0.000039


sun95w10.dat
Se I 9432.5
CN 9432.46 A
1.0
0.9
0.8
0.7
0.6
0.5
Spectral flux value
Fe2 9431.599 0.000395
Ti1 9431.618 0.039633
Fe1 9431.937 0.001016
Ti2 9432.122 0.946845
Fe2 9432.239 0.000148
Fe1 9432.257 0.002961
Co1 9432.603 0.000004
Ti1 9432.677 0.000168
Mg1 9432.745 2.069935
Mg1 9432.764 4.226272
9432.0
9432.5
9433.0
Laboratory wavelength (A)

Se I　組成解析 : log Se = 3.34

- Kurucz gf データがある3本のうち1本が等価幅測定可能

波長	χ(eV)	log gf	等価幅(mA)	log Se
9001.898	5.974	+0.0	0.6	3.699

→ ９００１線は候補になりうる。

→ 等価幅測定をより正確に行う必要がある。
あるいは、スペクトル合成を行う。

3. 結果と議論

1. AsとSeに吸収線候補の可能性を示す線が検出できた。
2. 同定と組成解析における問題点：

原子データ（gf値、波長）の不正確、欠如。

→ ・スペクトル合成、組成解析が不可能。

・目的以外の吸収線のブレンドの有無が判定不可。