

**Appendix A: Line properties**

Table A.1: Line transitions detected at 3 mm. H: Lines presenting hyperfile structure.

$\nu_{rest}$ (GHz)	Molecule	Transition	$T_A^*$ (mK)	Area (K km/s)	Notes
83.688093	SO <sub>2</sub>	8 <sub>1,7</sub> –8 <sub>0,8</sub>	12.5 ± 1.2	0.55	
84.746170	<sup>30</sup> SiO	2–1	84.0 ± 1.3	4.89	
85.759199	<sup>29</sup> SiO	2–1	103.0 ± 0.8	6.13	
86.093950	SO	2 <sub>2</sub> –1 <sub>1</sub>	8.9 ± 1.27	0.4	
86.339922	H <sup>13</sup> CN	1–0	37.4 ± 1.2	2.4	
86.846960	SiO	2–1	666.2 ± 0.9	34.32	
88.631602	HCN	1–0	234.2 ± 0.9	14.6	
89.188525	HCO <sup>+</sup>	1–0	3.9 ± 1.3	0.24	
90.663568	HNC	1–0	21.9 ± 0.9	1.29	
90.771564	SiS	5–4	4.4 ± 0.8	0.287	
93.173392	N <sub>2</sub> H <sup>+</sup>	1–0	5.9 ± 0.3	0.42	
93.979770	PN	2–1	7.0 ± 1.0	0.46	
96.741375	CH <sub>3</sub> OH	2–1	3.2 ± 0.6	0.15	
97.715317	<sup>34</sup> SO	2 <sub>3</sub> –1 <sub>2</sub>	5.1 ± 0.5	0.27	
97.980953	CS	2–1	13.9 ± 0.3	0.825	
99.299870	SO	2 <sub>3</sub> –1 <sub>2</sub>	89.2 ± 0.6	3.84	
104.029418	SO <sub>2</sub>	3 <sub>1,3</sub> –2 <sub>0,2</sub>	39.1 ± 0.6	1.71	
104.239295	SO <sub>2</sub>	10 <sub>1,9</sub> –10 <sub>0,10</sub>	8.6 ± 0.3	0.43	
108.924301	SiS	6–5	9.2 ± 0.7	0.392	
109.252220	SO	3 <sub>2</sub> –2 <sub>1</sub>	12.7 ± 1.3	0.65	
110.201354	<sup>13</sup> CO	1–0	57.1 ± 1.4	3.42	
113.123370	CN	1 <sub>1/2,1/2</sub> –0 <sub>1/2,1/2</sub>	16.5 ± 1.9	3.48	H
113.144157	CN	1 <sub>1/2,1/2</sub> –0 <sub>1/2,3/2</sub>	–	–	H
113.170492	CN	1 <sub>1/2,3/2</sub> –0 <sub>1/2,1/2</sub>	–	–	H
113.191279	CN	1 <sub>1/2,3/2</sub> –0 <sub>1/2,3/2</sub>	–	–	H
113.488120	CN	1 <sub>3/2,3/2</sub> –0 <sub>1/2,1/2</sub>	–	–	H
113.490970	CN	1 <sub>3/2,5/2</sub> –0 <sub>1/2,3/2</sub>	–	–	H
113.499644	CN	1 <sub>3/2,1/2</sub> –0 <sub>1/2,1/2</sub>	–	–	H
113.508907	CN	1 <sub>3/2,3/2</sub> –0 <sub>1/2,3/2</sub>	–	–	H
113.520432	CN	1 <sub>3/2,1/2</sub> –0 <sub>1/2,3/2</sub>	–	–	H
115.153935	NS	Π <sup>+</sup> 5/2 <sub>7/2</sub> –3/2 <sub>5/2</sub>	30.6 ± 2.7	2.09	H
115.156812	NS	Π <sup>+</sup> 5/2 <sub>5/2</sub> –3/2 <sub>3/2</sub>	–	–	H
115.162982	NS	Π <sup>+</sup> 5/2 <sub>3/2</sub> –3/2 <sub>1/2</sub>	–	–	H
115.185336	NS	Π <sup>+</sup> 5/2 <sub>3/2</sub> –3/2 <sub>3/2</sub>	–	–	H
115.191456	NS	Π <sup>+</sup> 5/2 <sub>5/2</sub> –3/2 <sub>5/2</sub>	–	–	H
115.271202	CO	1–0	657.5 ± 0.9	42.8	
115.556253	NS	Π <sup>–</sup> 5/2 <sub>7/2</sub> –3/2 <sub>5/2</sub>	21.8 ± 3.0	1.52	H
115.570763	NS	Π <sup>–</sup> 5/2 <sub>5/2</sub> –3/2 <sub>3/2</sub>	–	–	H
115.571954	NS	Π <sup>–</sup> 5/2 <sub>3/2</sub> –3/2 <sub>1/2</sub>	–	–	H

Table A.2: Line transitions detected at 1 mm. H: Lines presenting hyperfile structure. 8 MHz: Spectral resolution degraded to 8 Mhz to increase the S/N ratio.

$\nu_{rest}$ (GHz)	Molecule	Transition	$T_A^*$ (mK)	Area (K km/s)	Notes
199.672229	SiS	11–10	24 ± 2	0.463	
201.751489	Si <sup>18</sup> O	5–4	10.6 ± 2.5	0.40	
203.391550	SO <sub>2</sub>	12 <sub>0,12</sub> –11 <sub>1,11</sub>	17.2 ± 2.0	0.82	
206.176005	SO	5 <sub>4</sub> –4 <sub>3</sub>	40.3 ± 2.17	1.8	
207.436051	NS	Π <sup>+</sup> 9/2 <sub>11/2</sub> –7/2 <sub>9/2</sub>	48.8 ± 3.4	1.68	H
207.436636	NS	Π <sup>+</sup> 9/2 <sub>7/2</sub> –9/2 <sub>7/2</sub>	–	–	H
207.438692	NS	Π <sup>+</sup> 9/2 <sub>7/2</sub> –7/2 <sub>5/2</sub>	–	–	H
207.566407	U	–	12.0 ± 3.7	0.50	
207.777535	NS	Π <sup>–</sup> 9/2 <sub>9/2</sub> –7/2 <sub>9/2</sub>	53.2 ± 3.2	1.65	H
207.792951	NS	Π <sup>–</sup> 9/2 <sub>7/2</sub> –7/2 <sub>7/2</sub>	–	–	H
207.834866	NS	Π <sup>–</sup> 9/2 <sub>11/2</sub> –7/2 <sub>9/2</sub>	–	–	H
207.838365	NS	Π <sup>–</sup> 9/2 <sub>9/2</sub> –7/2 <sub>7/2</sub>	–	–	H
208.700336	SO <sub>2</sub>	3 <sub>2,2</sub> –2 <sub>2,1</sub>	50.1 ± 3.8	2.40	

Table A.2: continued.

$\nu_{rest}$ (GHz)	Molecule	Transition	$T_A^*$ (mK)	Area (K km/s)	Notes
211.853474	<sup>30</sup> SiO	5–4	169.7 ± 4.1	8.71	
214.385758	<sup>29</sup> SiO	5–4	118.7 ± 4.7	5.67	
215.220653	SO	5 <sub>5</sub> –4 <sub>4</sub>	21.9 ± 4.9	1.28	
217.104980	SiO	5–4	865.8 ± 4.2	42.37	
217.817663	SiS	12–11	10 ± 2	0.334	
218.440050	CH <sub>3</sub> OH	4–3	9.2 ± 2.0	0.20	
219.949442	SO	5 <sub>6</sub> –4 <sub>5</sub>	138.6 ± 3.1	5.70	
220.398684	<sup>13</sup> CO	2–1	315 ± 3	19.4	
221.965220	SO <sub>2</sub>	11 <sub>1,11</sub> –10 <sub>0,10</sub>	22.6 ± 2.8	1.05	
226.616571	CN	2 <sub>3/2,1/2</sub> –1 <sub>1/2,3/2</sub>	37.2 ± 2.8	3.29	H
226.632190	CN	2 <sub>3/2,3/2</sub> –1 <sub>1/2,3/2</sub>	–	–	H
226.659558	CN	2 <sub>3/2,5/2</sub> –1 <sub>1/2,3/2</sub>	–	–	H
226.663693	CN	2 <sub>3/2,1/2</sub> –1 <sub>1/2,1/2</sub>	–	–	H
226.679311	CN	2 <sub>3/2,3/2</sub> –1 <sub>1/2,1/2</sub>	–	–	H
226.874191	CN	2 <sub>5/2,5/2</sub> –1 <sub>3/2,3/2</sub>	–	–	H
226.874781	CN	2 <sub>5/2,7/2</sub> –1 <sub>3/2,5/2</sub>	–	–	H
226.887420	CN	2 <sub>5/2,3/2</sub> –1 <sub>3/2,3/2</sub>	–	–	H
226.892128	CN	2 <sub>5/2,5/2</sub> –1 <sub>3/2,5/2</sub>	–	–	H
226.905357	CN	2 <sub>5/2,3/2</sub> –1 <sub>3/2,5/2</sub>	–	–	H
230.538000	CO	2–1	2.511 10 <sup>3</sup> ± 3.2	159	
234.935695	PN	6–5	13.6 ± 2.9	0.45	
235.151720	SO <sub>2</sub>	4 <sub>2,2</sub> –3 <sub>1,3</sub>	59.1 ± 2.1	2.58	
235.961363	SiS	13–12	13.5 ± 3.5	0.43	
241.615797	SO <sub>2</sub>	5 <sub>2,4</sub> –4 <sub>1,3</sub>	20.3 ± 1.9	1.04	
244.365156	U	–	9.2 ± 2.9	0.61	8MHz
244.935557	CS	5–4	13.5 ± 3.5	0.72	
250.436848	NO	Π <sup>+</sup> 5/2 <sub>7/2</sub> –3/2 <sub>5/2</sub>	22.8 ± 2.4	1.49	H
250.440659	NO	Π <sup>+</sup> 5/2 <sub>5/2</sub> –3/2 <sub>3/2</sub>	–	–	H
250.448530	NO	Π <sup>+</sup> 5/2 <sub>3/2</sub> –3/2 <sub>1/2</sub>	–	–	H
250.475414	NO	Π <sup>+</sup> 5/2 <sub>3/2</sub> –3/2 <sub>3/2</sub>	–	–	H
250.482939	NO	Π <sup>+</sup> 5/2 <sub>5/2</sub> –3/2 <sub>5/2</sub>	–	–	H
250.796436	NO	Π <sup>–</sup> 5/2 <sub>7/2</sub> –3/2 <sub>5/2</sub>	19.0 ± 2.3	1.51	H
250.815594	NO	Π <sup>–</sup> 5/2 <sub>5/2</sub> –3/2 <sub>3/2</sub>	–	–	H
250.816954	NO	Π <sup>–</sup> 5/2 <sub>3/2</sub> –3/2 <sub>1/2</sub>	–	–	H
251.199675	SO <sub>2</sub>	13 <sub>1,13</sub> –12 <sub>0,12</sub>	24.0 ± 2.5	1.12	
251.826156	SO	6 <sub>5</sub> –5 <sub>4</sub>	35.9 ± 3.0	1.06	
251.912005	U	3–2	7.0 ± 2.2	0.09	
253.968393	NS	Π <sup>–</sup> 11/2 <sub>13/2</sub> –9/2 <sub>11/2</sub>	38.3 ± 2.7	1.39	H
253.970581	NS	Π <sup>–</sup> 11/2 <sub>11/2</sub> –9/2 <sub>9/2</sub>	–	–	H
254.216656	<sup>30</sup> SiO	6–5	115.3 ± 3.7	4.70	
254.280536	SO <sub>2</sub>	6 <sub>3,3</sub> –6 <sub>2,4</sub>	14.4 ± 3.6	0.31	
255.553302	SO <sub>2</sub>	4 <sub>3,1</sub> –4 <sub>2,2</sub>	14.1 ± 2.9	0.51	
255.958044	SO <sub>2</sub>	3 <sub>3,1</sub> –3 <sub>2,2</sub>	10.3 ± 2.6	0.74	
256.246945	SO <sub>2</sub>	5 <sub>3,3</sub> –5 <sub>2,4</sub>	26.0 ± 3.7	0.89	
257.099966	SO <sub>2</sub>	7 <sub>3,5</sub> –7 <sub>2,6</sub>	12.9 ± 2.4	0.85	
257.255216	<sup>29</sup> SiO	6–5	179.4 ± 2.6	8.59	
258.255826	SO	6 <sub>6</sub> –5 <sub>5</sub>	2.7 ± 3.3	1.62	
259.011821	H <sup>13</sup> CN	3–2	80.0 ± 3.3	4.11	
260.518020	SiO	6–5	959 ± 2.2	47.9	
261.259318	HN <sup>13</sup> C	3–2	15.7 ± 4.8	0.78	
261.843721	SO	6 <sub>7</sub> –5 <sub>6</sub>	77.5 ± 6.0	2.58	
265.886180	HCN	3–2	529.3 ± 4.1	24.1	
271.529014	SO <sub>2</sub>	7 <sub>2,6</sub> –6 <sub>1,5</sub>	19.9 ± 3.8	0.823	
271.981142	HNC	3–2	167.6 ± 4.6	8.24	

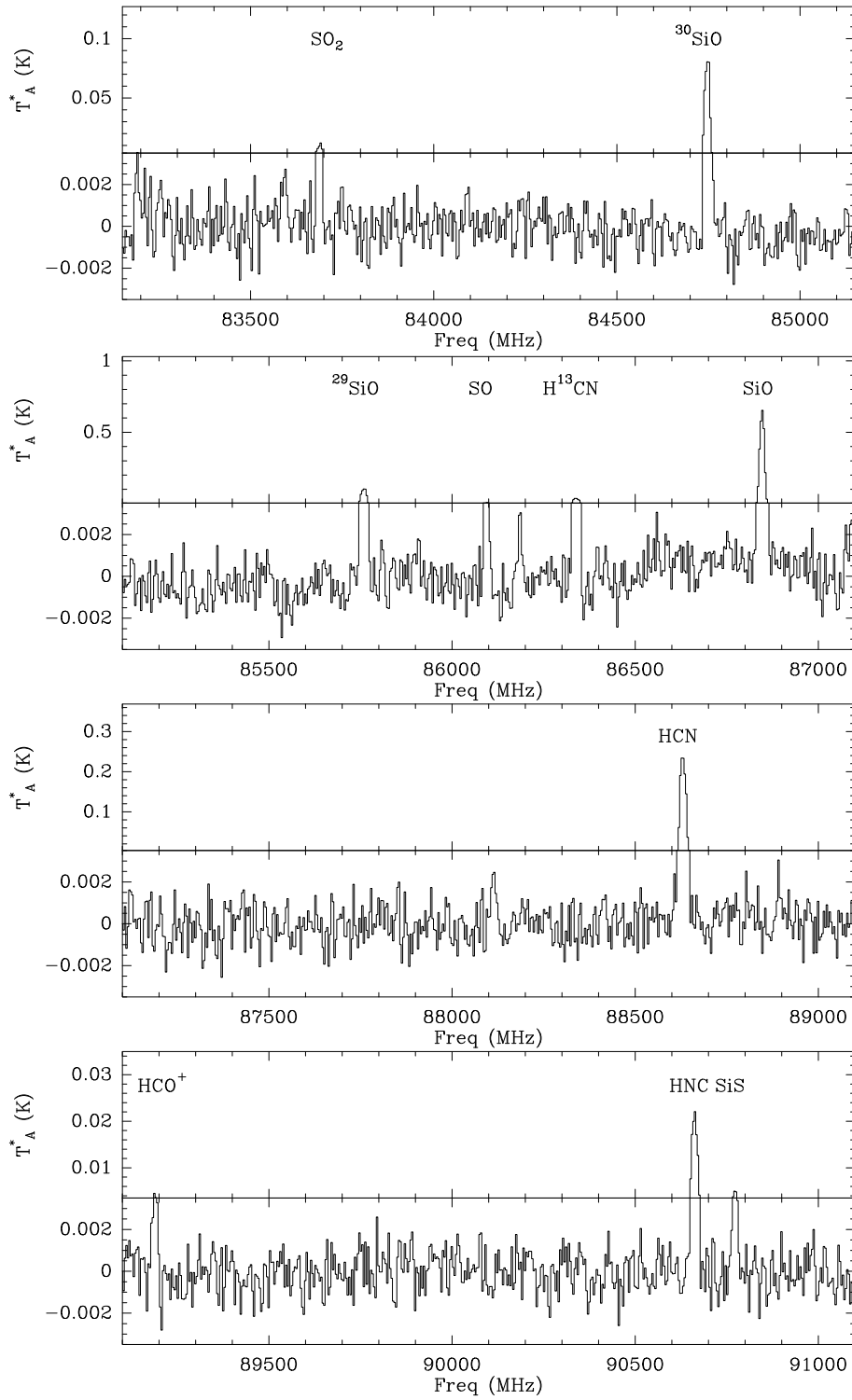


Fig. A.1: Spectral survey obtained with the IRAM 30 m telescope at the atmospheric window of 3 mm. The  $v_{\text{LSR}}$  of IRC +10420 used to calculate the frequencies of the spectra is 76 km/s.

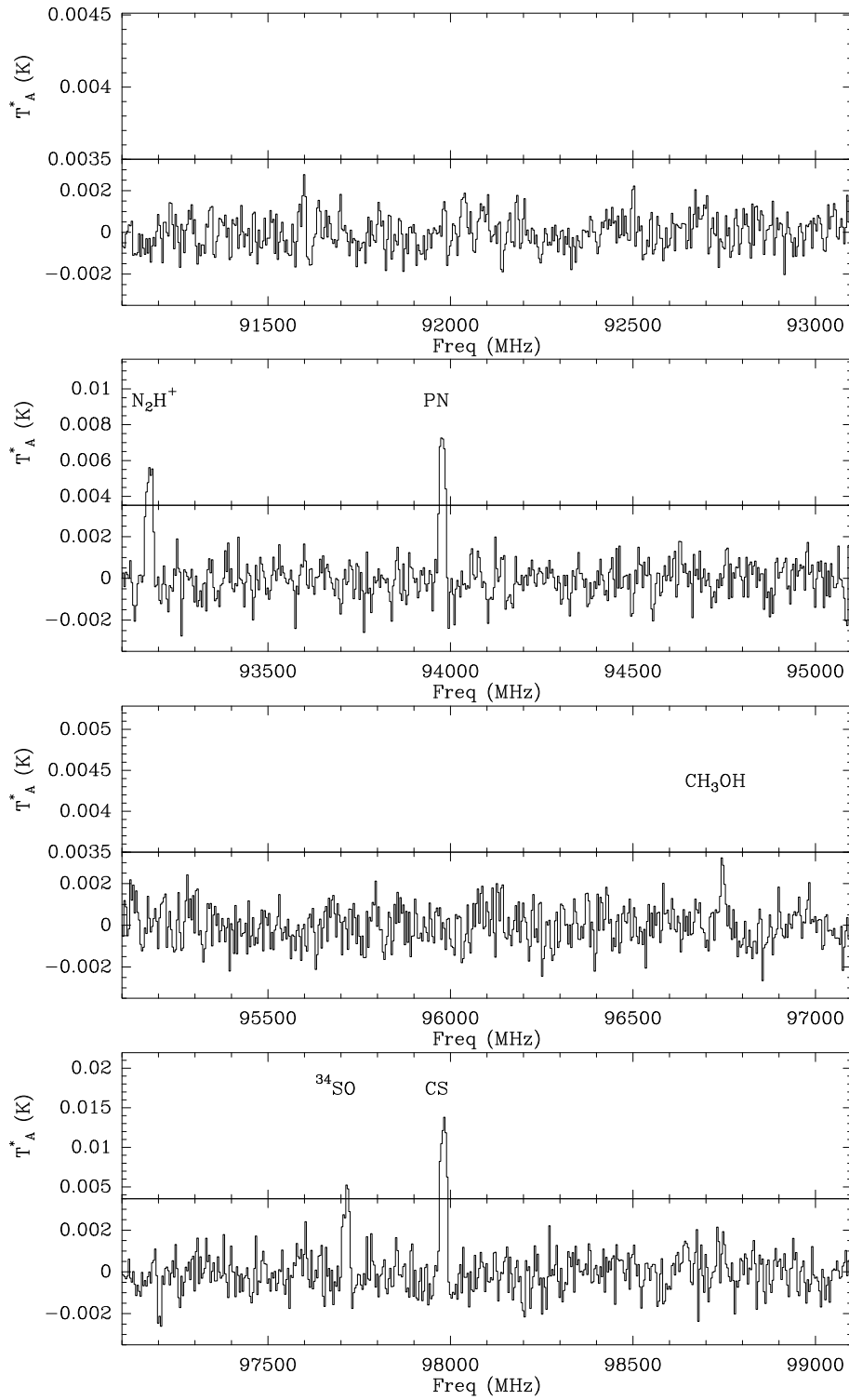


Fig. A.1: . (continued)

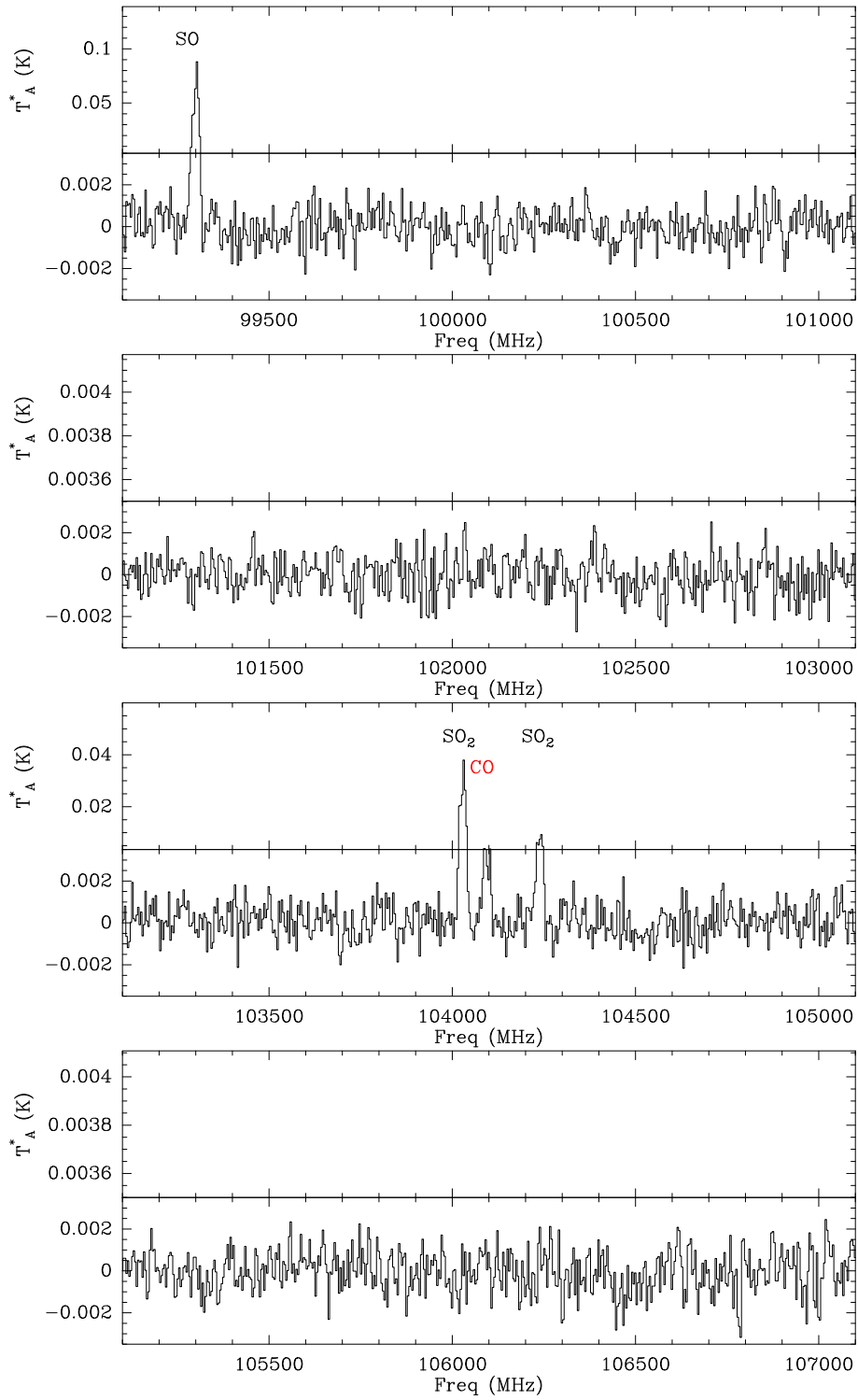


Fig. A.1: . (continued)

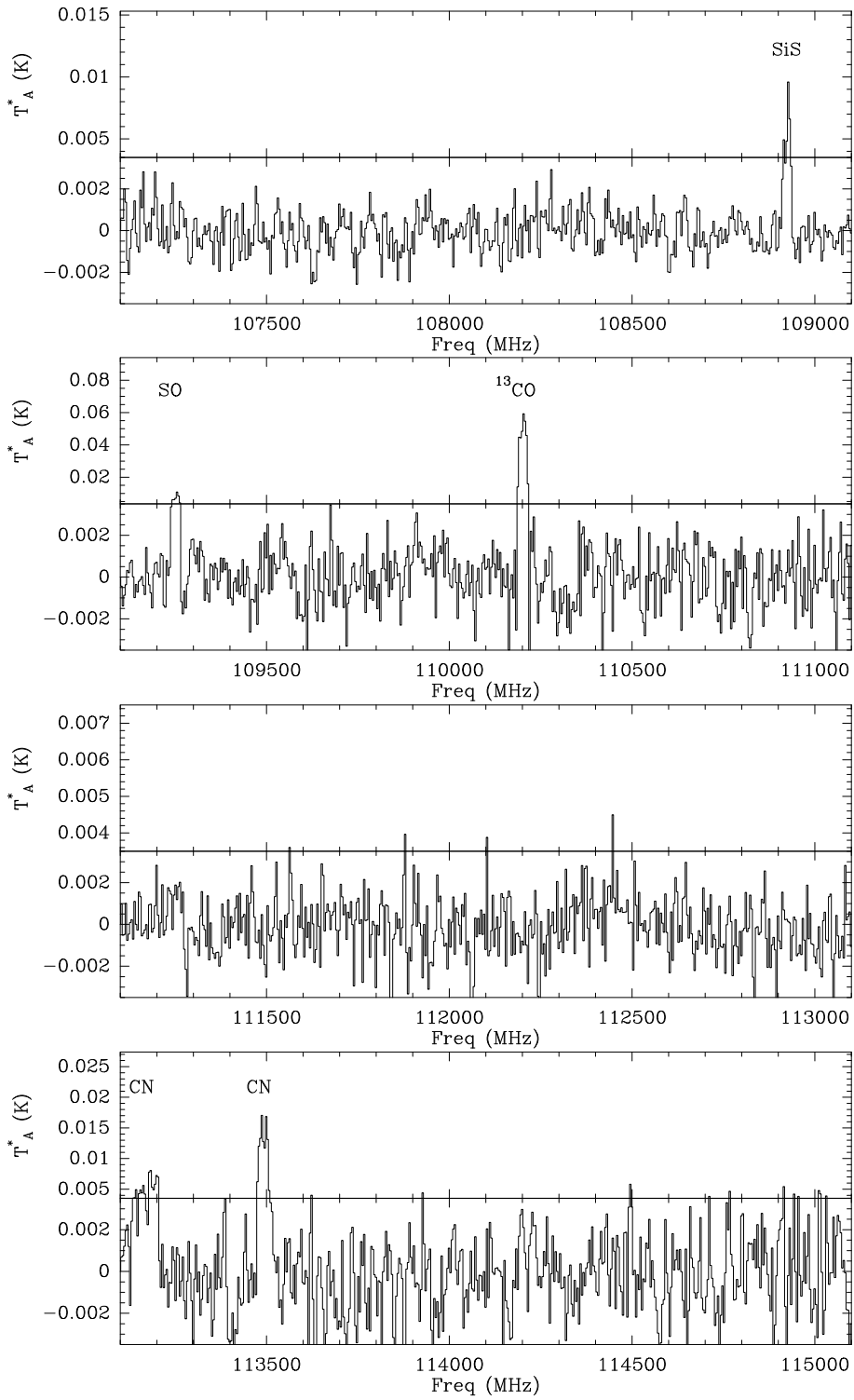


Fig. A.1: . (continued)

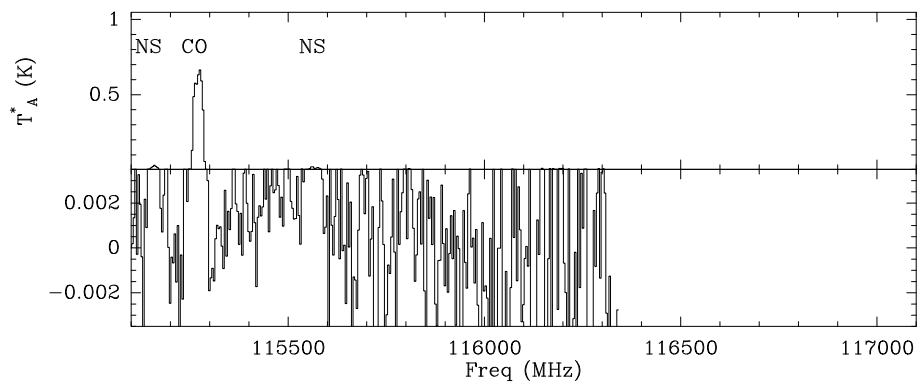


Fig. A.1: . (continued)



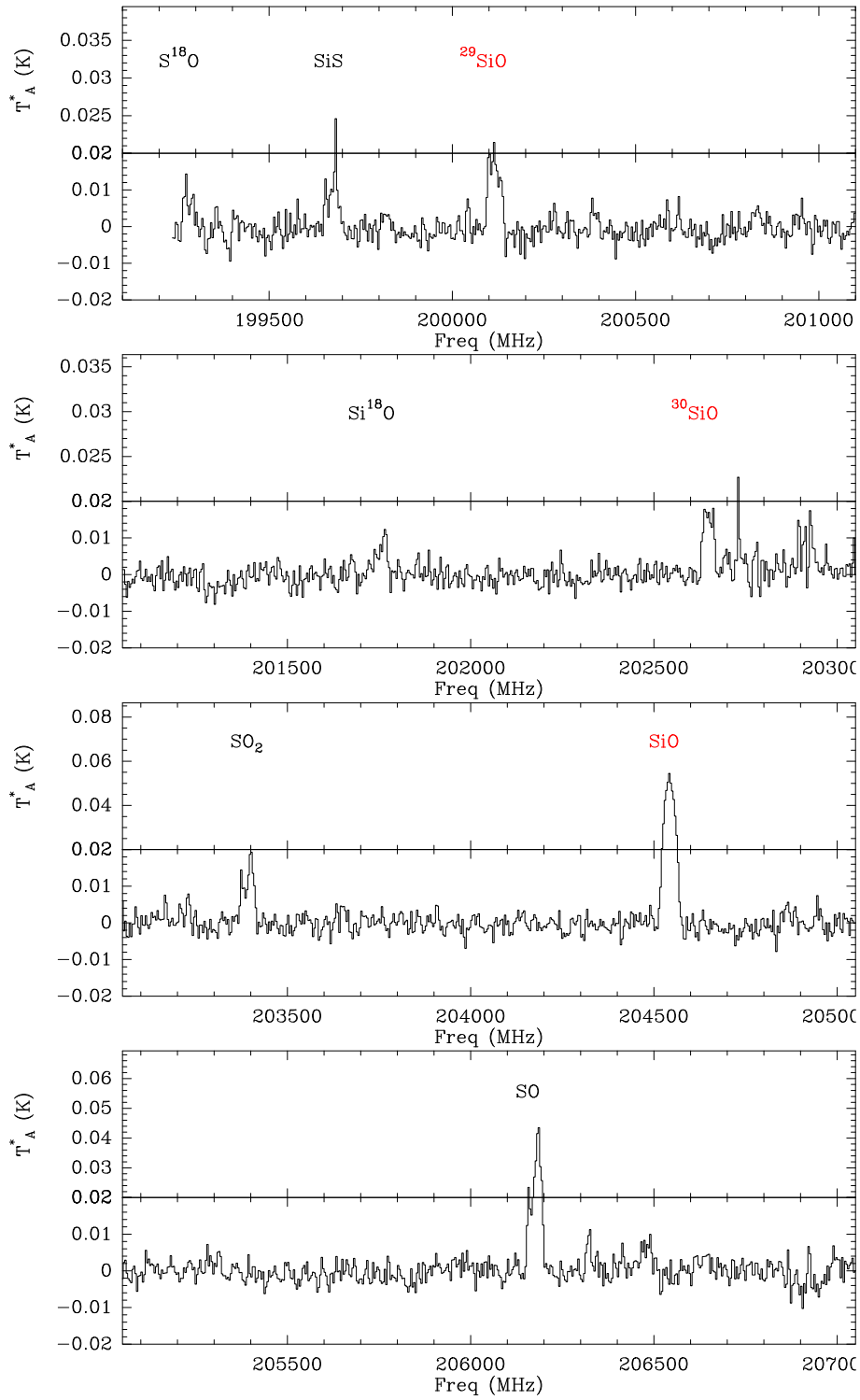


Fig. A.2: Spectral survey obtained with the IRAM 30 m telescope at the atmospheric window of 1 mm. The  $v_{LSR}$  of IRC +10420 used to calculate the frequencies of the spectra is 76 km/s.

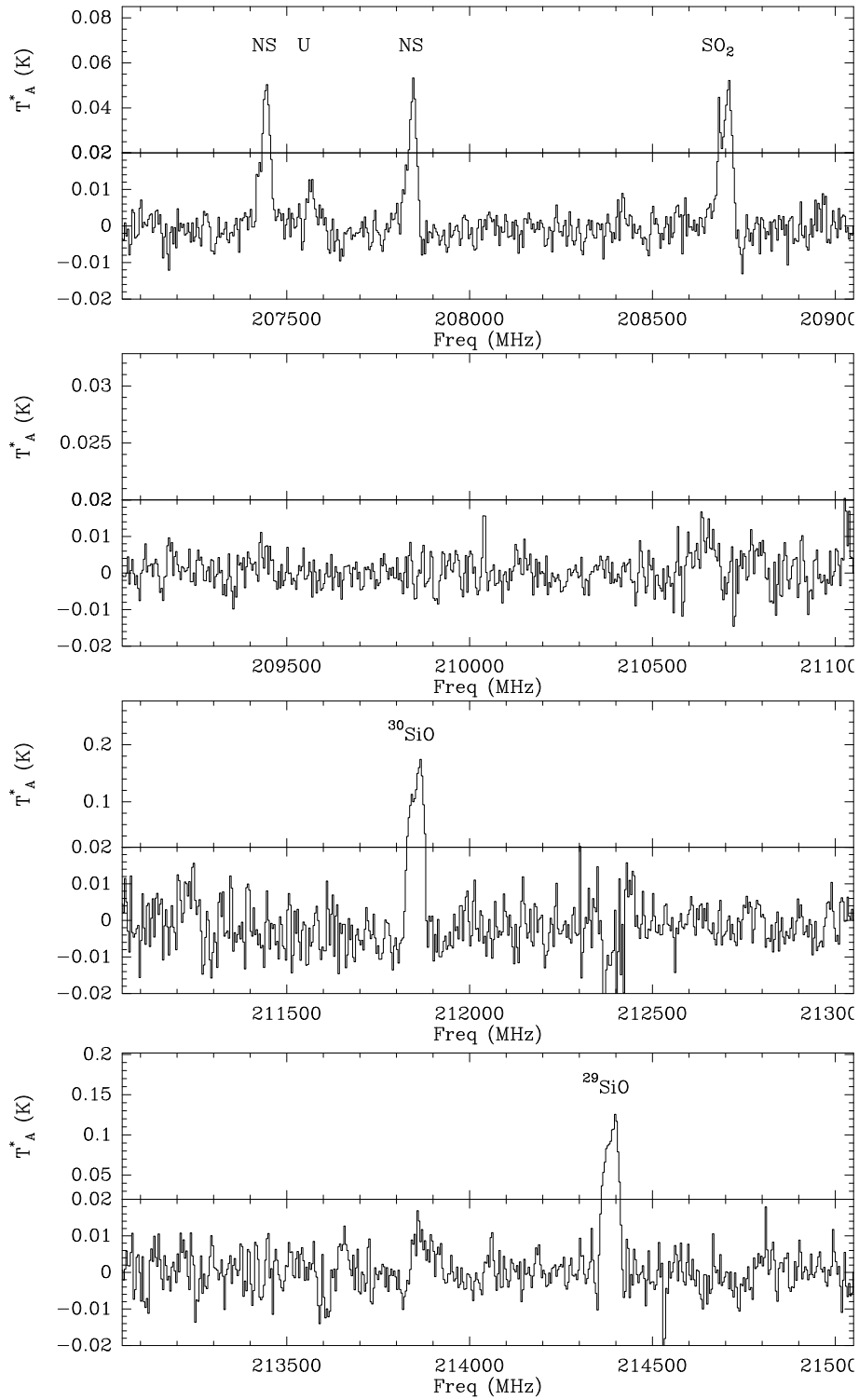


Fig. A.2: . (continued)

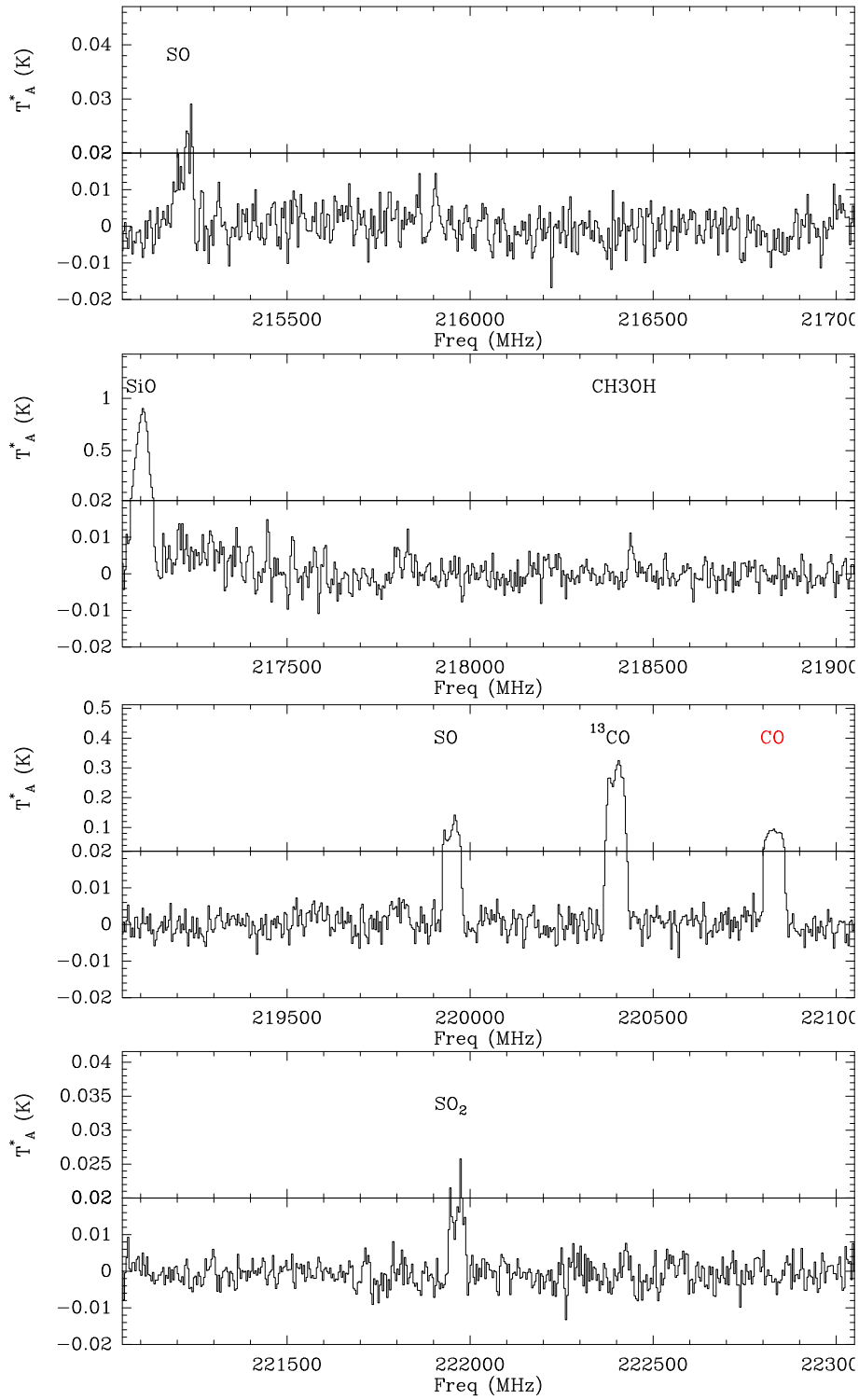


Fig. A.2: . (continued)

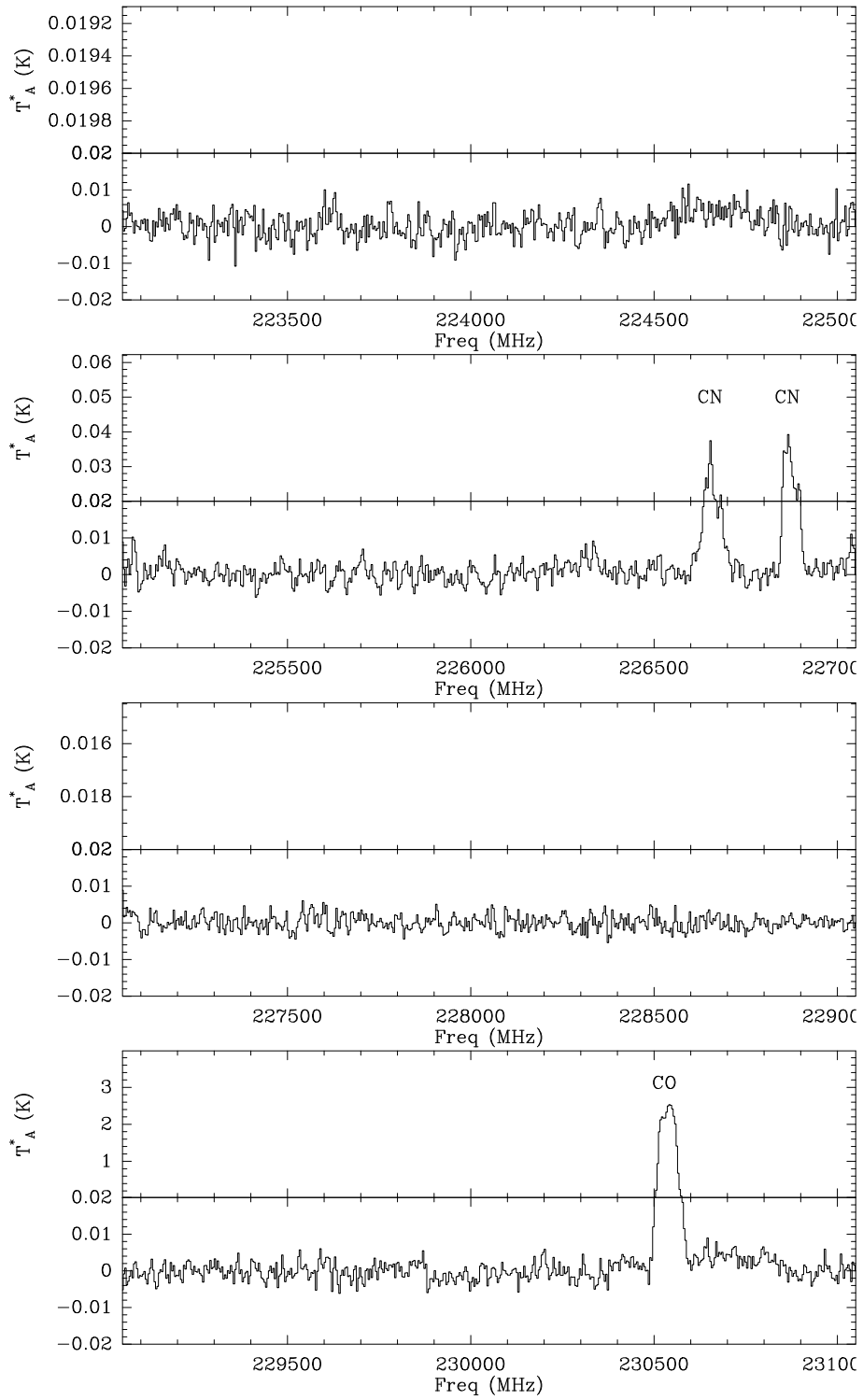


Fig. A.2: . (continued)

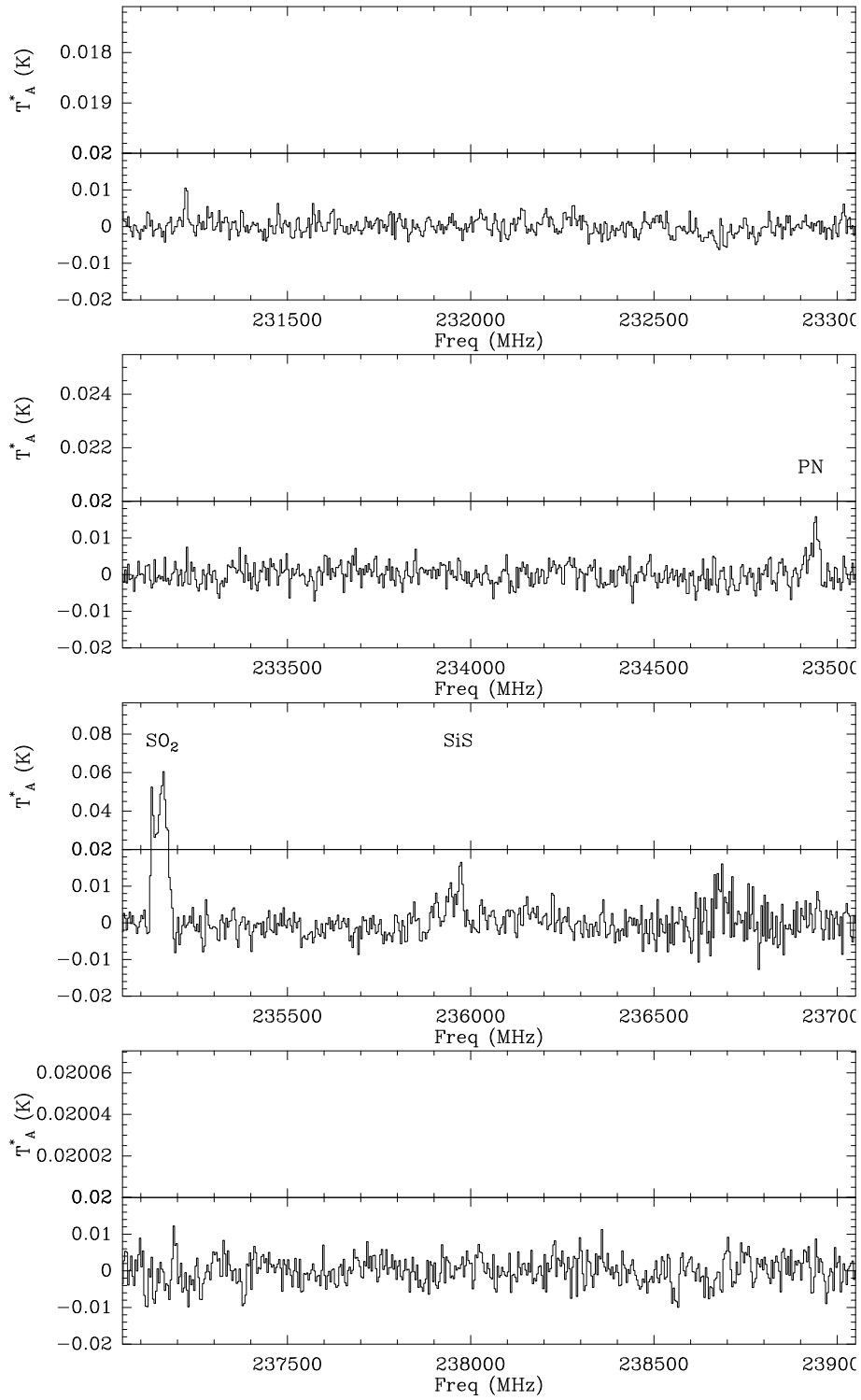


Fig. A.2: . (continued)

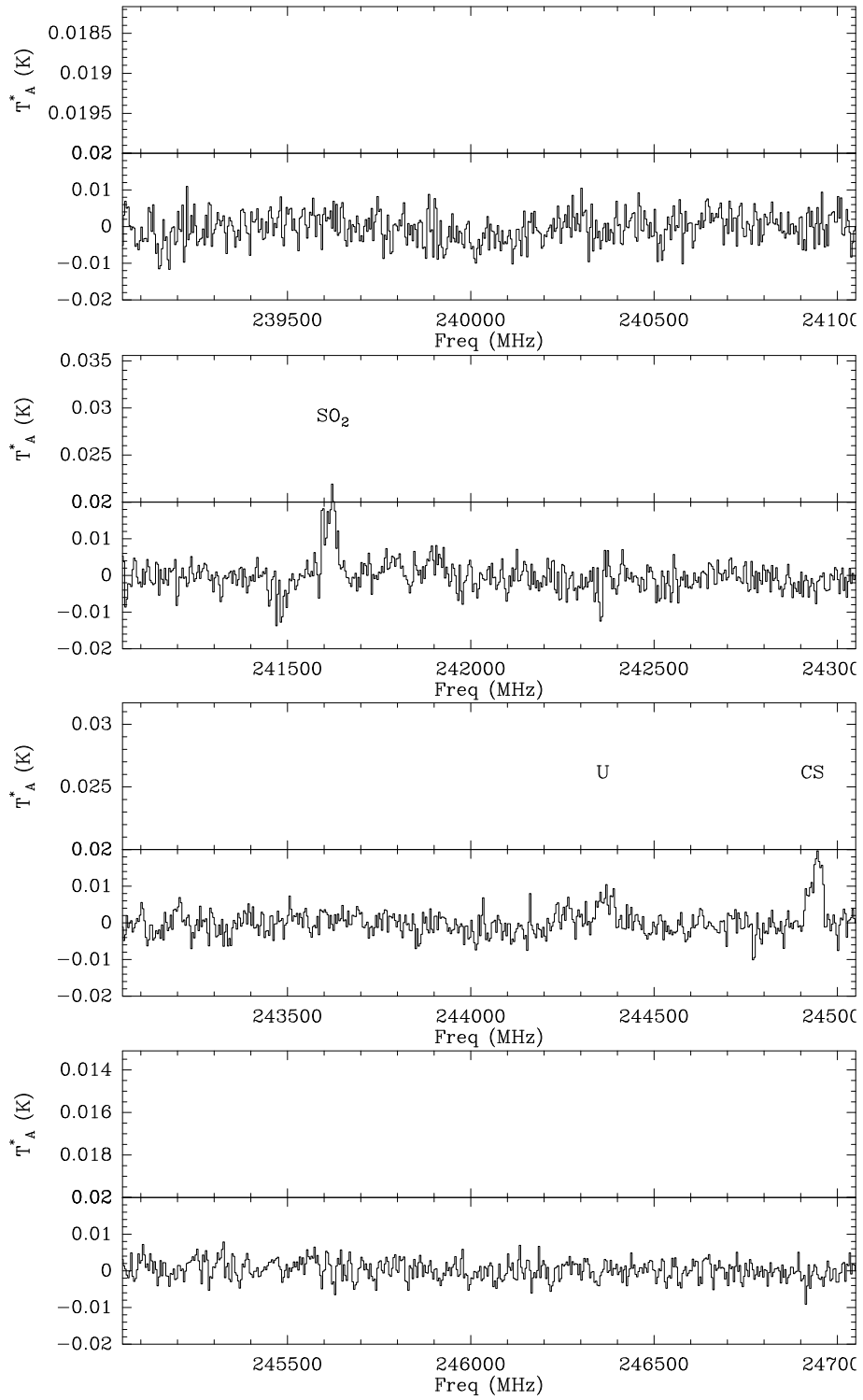


Fig. A.2: . (continued)

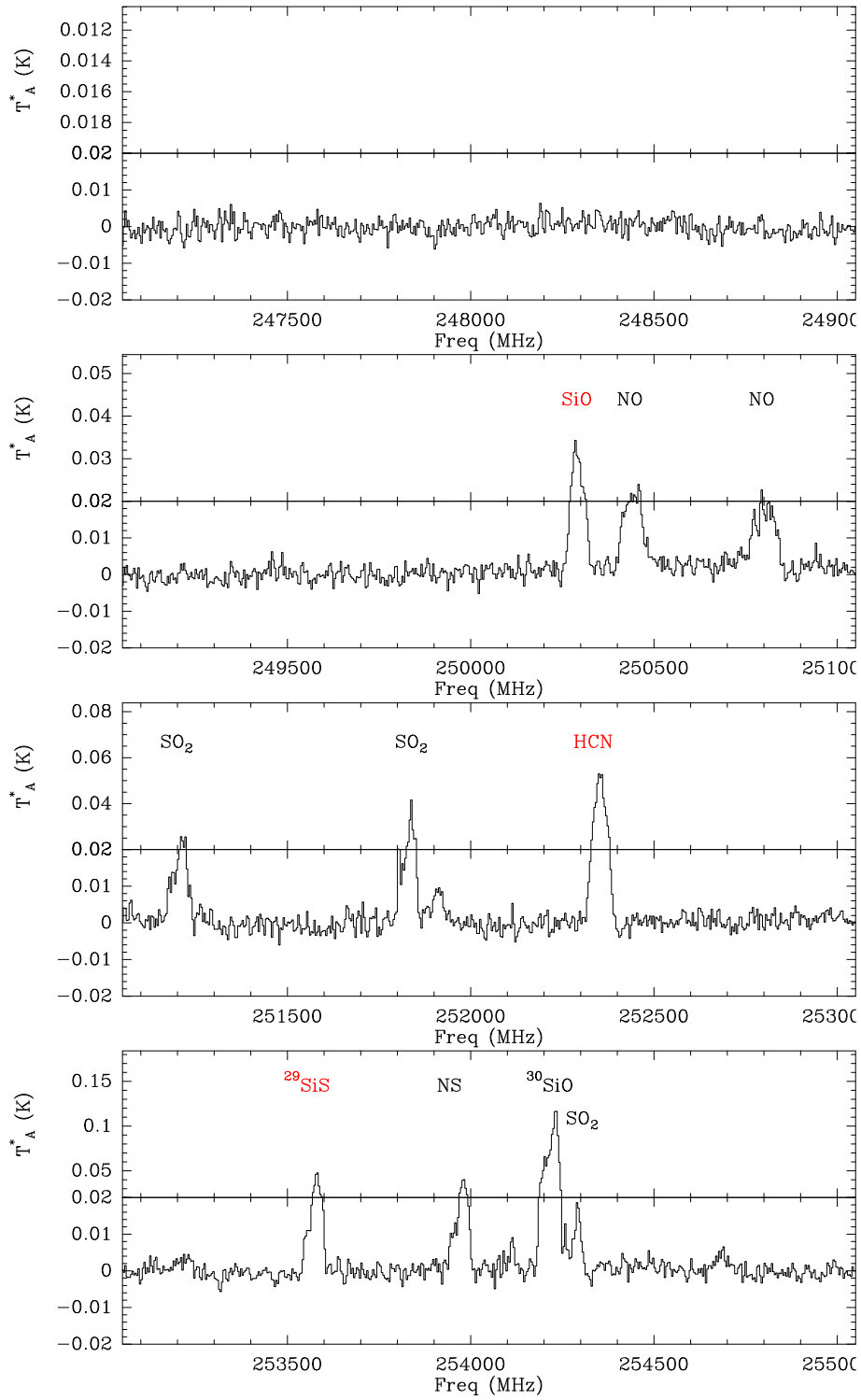


Fig. A.2: . (continued)

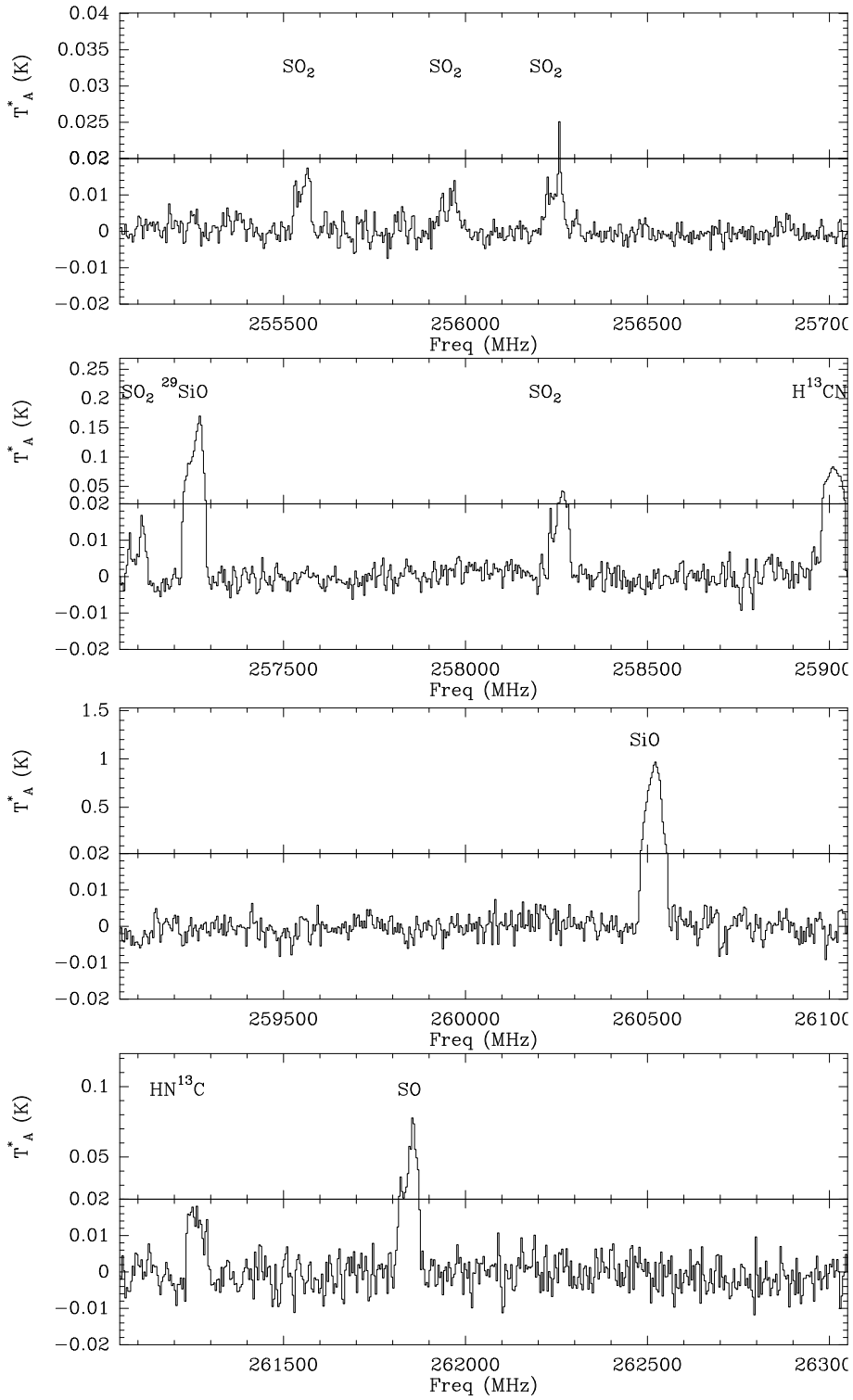


Fig. A.2: . (continued)



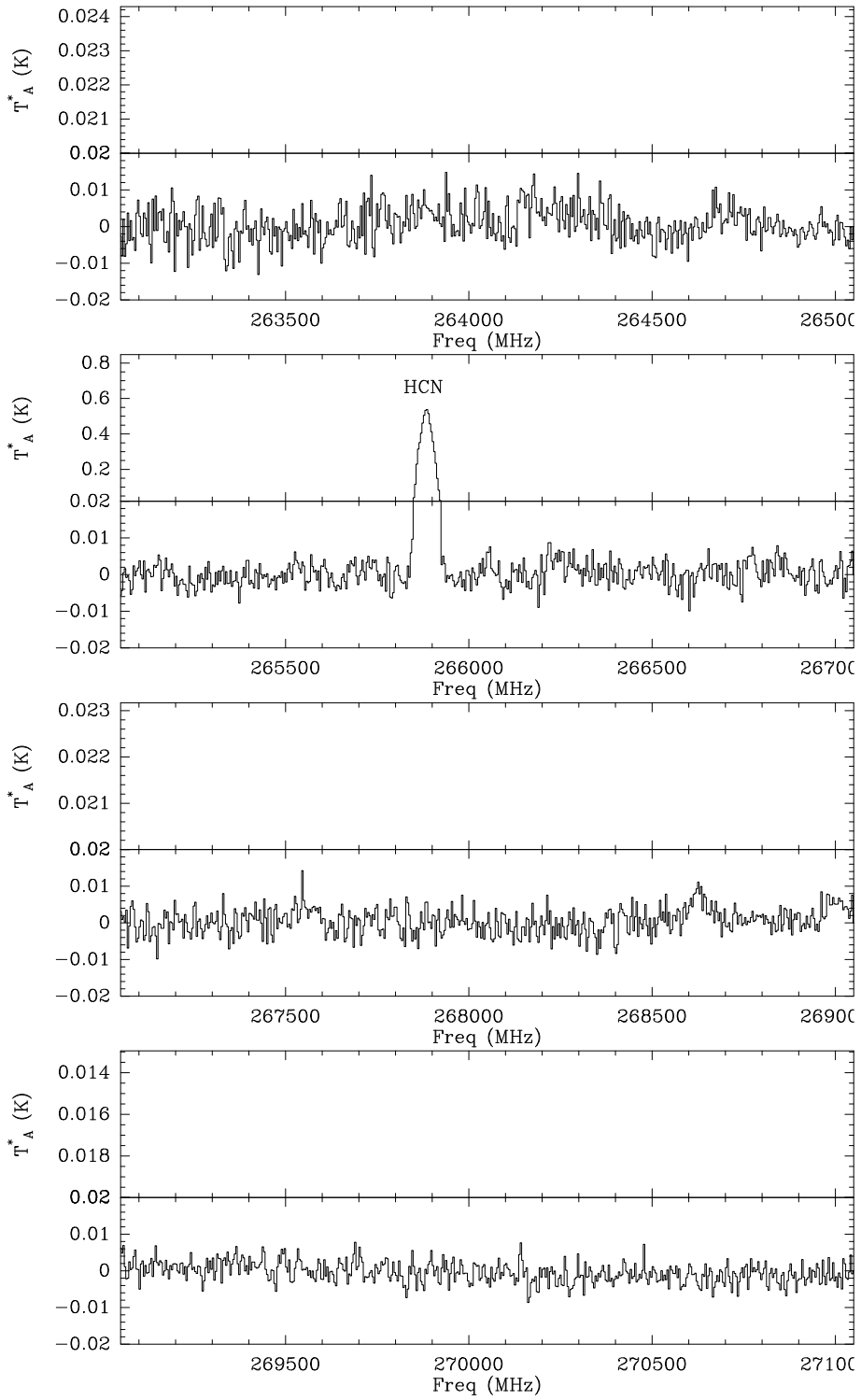


Fig. A.2: . (continued)

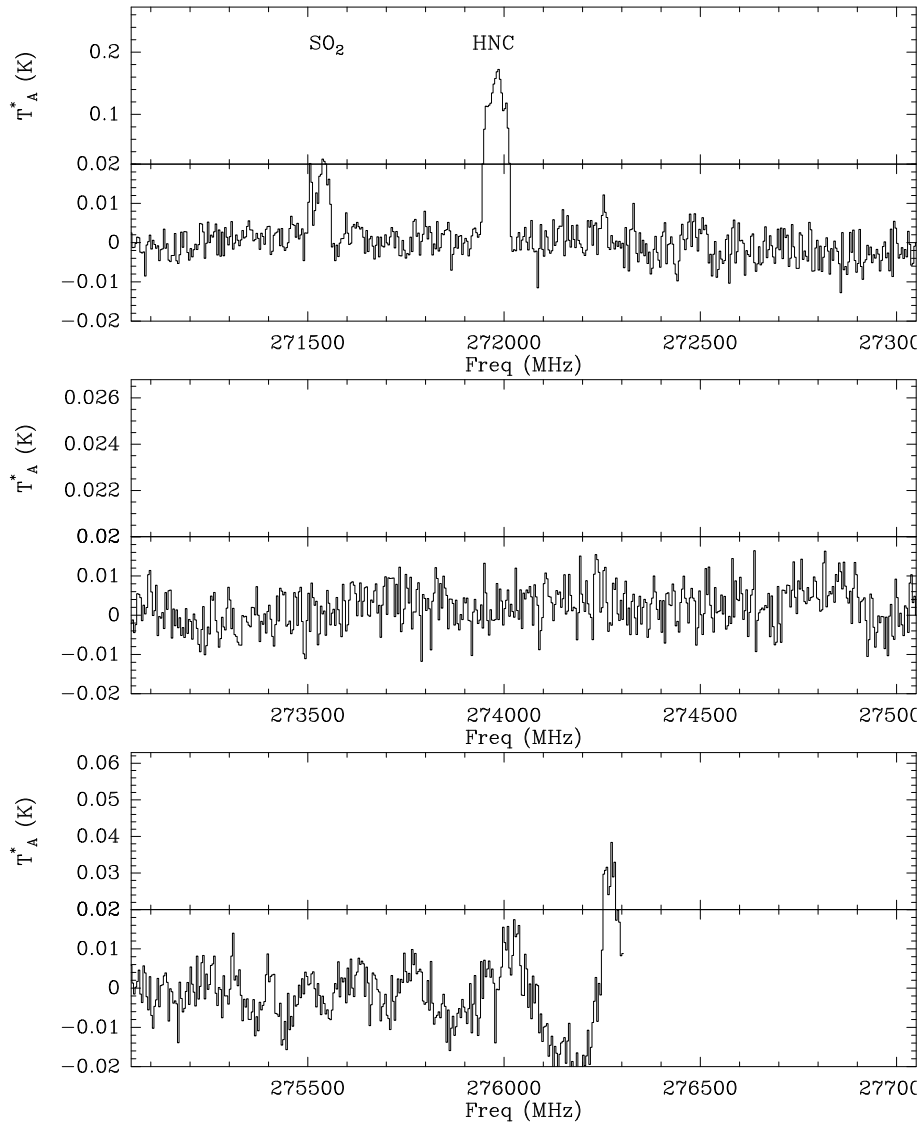


Fig. A.2: . (continued)

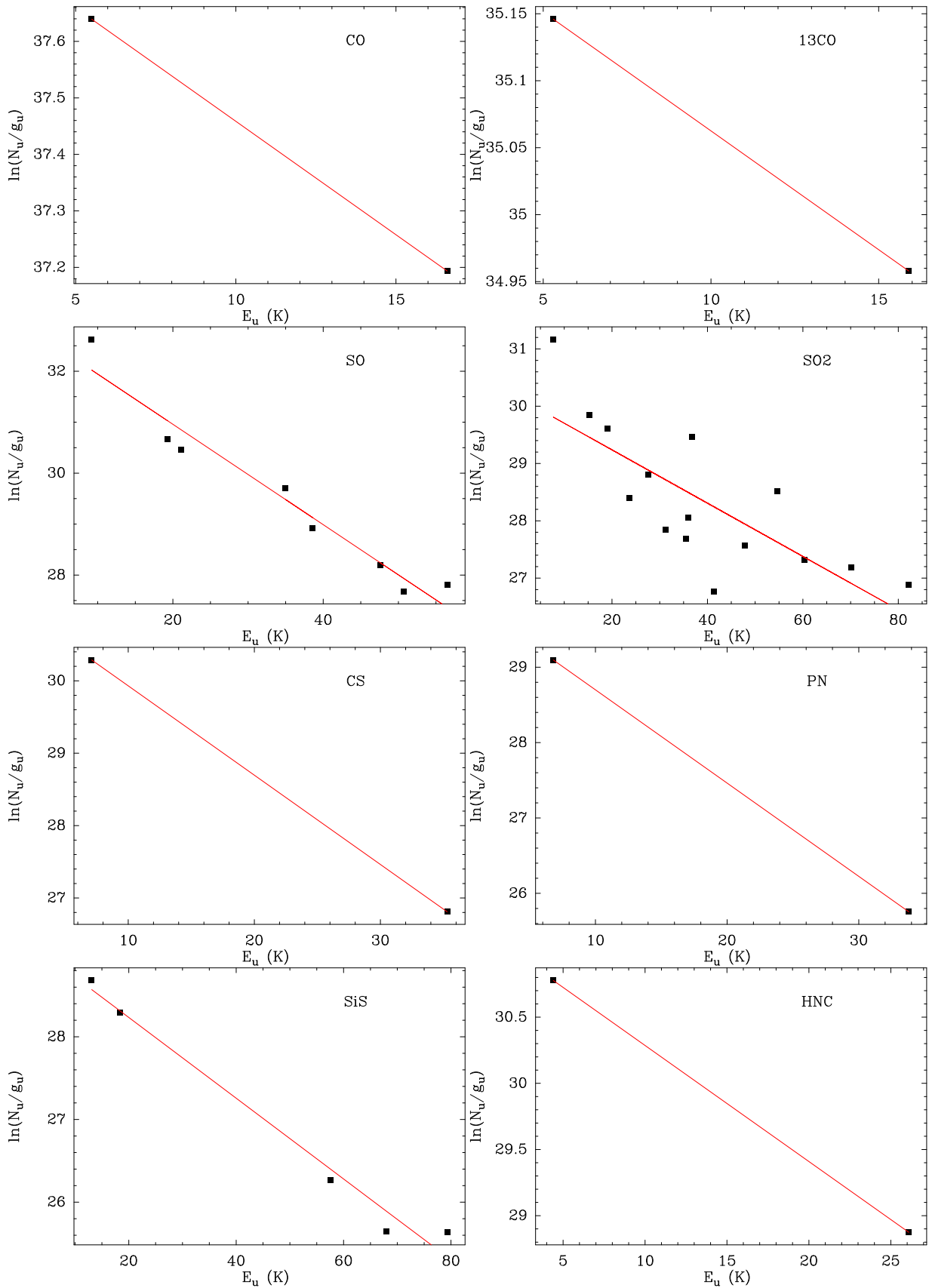


Fig. A.3: Rotational diagrams for CO, SO, SO<sub>2</sub>, CS, PN, SiS, and HNC.

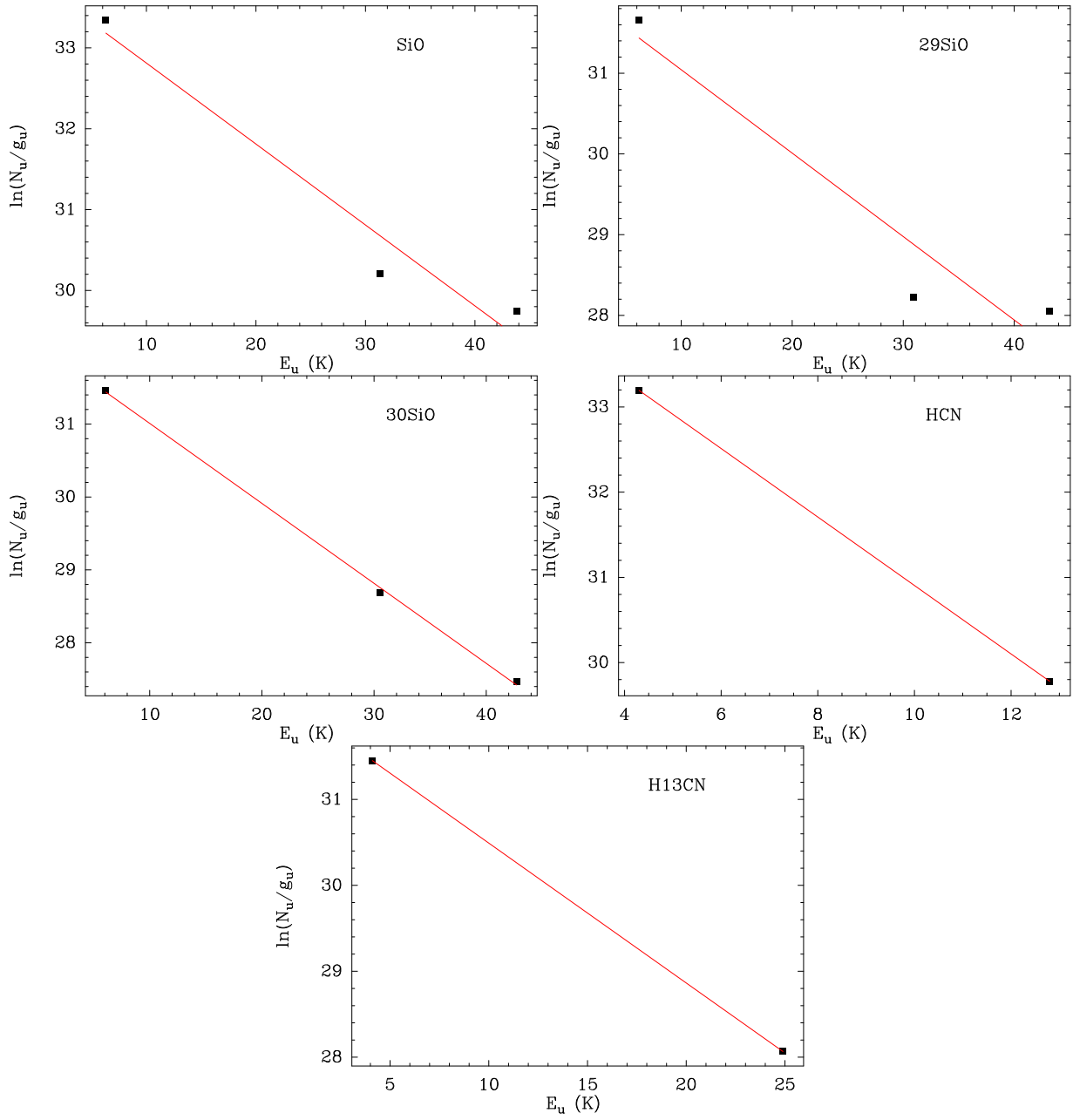


Fig. A.4: Rotational diagrams of SiO, HCN, and their isotopologues.

