**Table 1.** COMs and COM precursors transitions covered in our L1517B observations and their derived line parameters.

| | | | Dust peak | | | | Methanol peak | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **Line** | **Frequency** (MHz) | **Area** [a] (mK km s$^{-1}$) | **Linewidth** (km s$^{-1}$) | **LSR velocity** [b] (km s$^{-1}$) | **S/N** [c] | **Area** [a] (mK km s$^{-1}$) | **Linewidth** (km s$^{-1}$) | **LSR velocity** [b] (km s$^{-1}$) | **S/N** [c] |
| $CH_3OH$ | $2_{0,2} \rightarrow 1_{0,1}$ A | 96741.371 | $206.1 \pm 1.9$ | $0.278 \pm 0.004$ | $5.785 \pm 0.002$ | 109 | $241.1 \pm 2.0$ | $0.277 \pm 0.005$ | $5.788 \pm 0.002$ | 121 |
| | $2_{1,2} \rightarrow 1_{1,1}$ A | 95914.310 | $< 6$ | ... | ... | ... | $< 6$ | ... | ... | ... |
| | $2_{1,1} \rightarrow 1_{1,0}$ A | 97582.798 | $< 2.4$ | ... | ... | ... | $< 2.4$ | ... | ... | ... |
| | $2_{1,2} \rightarrow 1_{1,1}$ E | 96739.358 | $150.4 \pm 1.9$ | $0.262 \pm 0.008$ | $5.786 \pm 0.003$ | 80 | $181.6 \pm 2.0$ | $0.262 \pm 0.003$ | $5.785 \pm 0.003$ | 92 |
| | $2_{0,2} \rightarrow 1_{0,1}$ E | 96744.545 | $9.7 \pm 1.9$ | $0.244 \pm 0.012$ | $5.84 \pm 0.04$ | 5.1 | $11.2 \pm 2.0$ | $0.23 \pm 0.08$ | $5.78 \pm 0.03$ | 5.6 |
| | $2_{1,1} \rightarrow 1_{1,0}$ E | 96755.501 | $< 6$ | ... | ... | ... | $< 6$ | ... | ... | ... |
| $CH_3O$ | $1_{0,0,6,1} \rightarrow 0_{0,1,6,0}$ | 82455.980 | $< 5$ | ... | ... | ... | $< 4$ | ... | ... | ... |
| | $1_{0,0,2,2} \rightarrow 0_{0,1,2,1}$ | 82458.252 | $5.4 \pm 1.2$ | $0.41 \pm 0.08$ | $5.81 \pm 0.03$ | 4.5 | $4.2 \pm 0.9$ | $0.39 \pm 0.08$ | $5.82 \pm 0.03$ | 4.7 |
| | $1_{0,1,2,2} \rightarrow 0_{0,0,2,1}$ | 82471.825 | $5.4 \pm 1.2$ | $0.41 \pm 0.08$ | $5.81 \pm 0.03$ | 4.5 | $4.2 \pm 0.9$ | $0.39 \pm 0.08$ | $5.82 \pm 0.03$ | 4.7 |
| | $1_{0,1,6,1} \rightarrow 0_{0,0,6,0}$ | 82524.180 | $< 5$ | ... | ... | ... | $< 4$ | ... | ... | ... |
| CCCO | $10 \rightarrow 9$ | 96214.813 | $< 7$ | ... | ... | ... | $< 7$ | ... | ... | ... |
| t-HCOOH | $1_{1,1} \rightarrow 0_{0,0}$ | 87926.863 | $< 1.9$ | ... | ... | ... | $< 2.2$ | ... | ... | ... |
| $H_2CCO$ | $4_{1,3} \rightarrow 3_{1,2}$ | 81586.299 | $11.1 \pm 1.3$ | $0.53 \pm 0.10$ | $5.89 \pm 0.04$ | 8.5 | $12.6 \pm 1.2$ | $0.70 \pm 0.25$ | $5.95 \pm 0.11$ | 10 |
| | $5_{1,5} \rightarrow 4_{1,4}$ | 100094.510 | $9.9 \pm 0.9$ | $0.53 \pm 0.10$ | $5.89 \pm 0.04$ | 11 | $12.6 \pm 1.2$ | $0.70 \pm 0.25$ | $5.95 \pm 0.11$ | 10 |
| | $4_{0,4} \rightarrow 3_{0,3}$ | 80832.189 | $21 \pm 4$ | $0.53 \pm 0.10$ | $5.89 \pm 0.04$ | 5.2 | $17 \pm 4$ | $0.70 \pm 0.25$ | $5.95 \pm 0.11$ | 4.2 |
| $CH_3OCHO$ | $7_{2,6,0} \rightarrow 6_{2,5,0}$ | 84454.754 | $< 2.0$ | ... | ... | ... | $< 2.5$ | ... | ... | ... |
| $CH_3OCH_3$ | $3_{1,3,1} \rightarrow 2_{0,2,1}$ | 82650.180 | $< 3$ | ... | ... | ... | $< 2.4$ | ... | ... | ... |
| | $4_{1,4,0} \rightarrow 3_{0,3,0}$ | 99326.000 | $< 2.0$ | ... | ... | ... | $< 2.2$ | ... | ... | ... |
| $CH_3CHO$ | $5_{1,4,0} \rightarrow 4_{1,3,0}$ | 98900.944 | $< 3$ | ... | ... | ... | $4.0 \pm 0.8$ | $0.21 \pm 0.05$ | $5.765 \pm 0.018$ | 5.0 |
| | $5_{0,5,0} \rightarrow 4_{0,4,0}$ | 95963.459 | $< 7$ | ... | ... | ... | $< 7$ | ... | ... | ... |
| | $4_{1,3,0} \rightarrow 3_{1,2,0}$ | 79150.166 | $< 3$ | ... | ... | ... | $3.9 \pm 0.7$ | $0.21 \pm 0.05$ | $5.765 \pm 0.018$ | 5.6 |
| | $4_{1,3,2} \rightarrow 3_{1,2,2}$ | 79099.313 | $< 3$ | ... | ... | ... | $3.9 \pm 0.7$ | $0.21 \pm 0.05$ | $5.765 \pm 0.018$ | 5.6 |
| c-$C_3H_2O$ | $6_{1,6} \rightarrow 5_{1,5}$ | 79483.519 | $< 3$ | ... | ... | ... | $< 3$ | ... | ... | ... |
| HCCCHO | $9_{0,9} \rightarrow 8_{0,8}$ | 83775.816 | $< 2.0$ | ... | ... | ... | $< 2.5$ | ... | ... | ... |
| $CH_3CN$ | $6_0 \rightarrow 5_0$ | 110383.500 | $6.4 \pm 1.9$ | $0.13 \pm 0.13$ | $5.902 \pm 0.023$ | 3.4 | $< 6$ | ... | ... | ... |
| | $6_1 \rightarrow 5_1$ | 110381.372 | $11.8 \pm 1.9$ | $0.24 \pm 0.08$ | $5.81 \pm 0.03$ | 6.2 | $< 6$ | ... | ... | ... |
| | $6_2 \rightarrow 5_2$ | 110374.989 | $< 10$ | ... | ... | ... | $< 6$ | ... | ... | ... |
| $CH_3NC$ | $5_0 \rightarrow 4_0$ | 100526.541 | $4.2 \pm 0.9$ | $0.6 \pm 0.3$ | $< 6$ | 4.7 | $< 2.2$ | ... | ... | ... |
| $CH_2CHCN$ | $9_{0,9,0,8} \rightarrow 8_{0,8,0,7}$ | 84945.988 | $< 2.0$ | ... | ... | ... | $< 2.5$ | ... | ... | ... |
| | $9_{1,9,0,9} \rightarrow 8_{1,8,0,8}$ | 83207.496 | $< 3$ | ... | ... | ... | $< 2.4$ | ... | ... | ... |
| | $10_{0,10,0,9} \rightarrow 9_{0,9,0,8}$ | 94276.625 | $< 3$ | ... | ... | ... | $< 2.4$ | ... | ... | ... |
| HCCCN | $9 \rightarrow 8$ | 81881.461 | $693.6 \pm 1.0$ | $0.395 \pm 0.001$ | $5.824 \pm 0.001$ | 694 | $346.7 \pm 0.9$ | $0.383 \pm 0.002$ | $5.816 \pm 0.001$ | 385 |
| | $11 \rightarrow 10$ | 100076.392 | $286.5 \pm 0.7$ | $0.318 \pm 0.001$ | $5.842 \pm 0.001$ | 409 | $96.3 \pm 0.8$ | $0.290 \pm 0.003$ | $5.837 \pm 0.001$ | 120 |
| HCCNC | $8_8 \rightarrow 7_8$ | 79484.131 | $16.1 \pm 1.1$ | $0.31 \pm 0.15$ | $5.83 \pm 0.07$ | 15 | $6.9 \pm 0.9$ | $0.29 \pm 0.16$ | $5.86 \pm 0.06$ | 7.7 |
| | $10_{10} \rightarrow 9_{10}$ | 99354.250 | $6.8 \pm 0.7$ | $0.31 \pm 0.15$ | $5.83 \pm 0.07$ | 9.7 | $< 3$ | ... | ... | ... |

**Notes.** Line profiles were fitted using MADCUBA, except for methanol ($CH_3OH$), cyanoacetilene (HCCCN) and acetonitrile ($CH_3CN$), where we used CLASS (see Section X for details). ([a]) Uncertainties in the line area are calculated as $\Delta T(\Delta v\, \delta v)^{1/2}$, with $\Delta T$ the RMS noise level, $\Delta v$ the line width, and $\delta v$ the velocity resolution of the spectrum. Similarly, upper limits are calculated as 3 $\Delta T(\Delta v\, \delta v)^{1/2}$. ([b]) LSR stands for *local sidereal rest*. ([c]) This refers to the signal to noise ratio in integrated intensity area. If a certain value has no uncertainty, this means that it had to be fixed so that MADCUBA could fit the LTE model.

**Table 2.** Excitation/kinetic temperatures ($T$), column densities ($N_{obs}$), and abundances ($\chi_{obs}$ ) of COMs and COM precursors toward the dust and methanol peaks in L1517B.

| | Dust peak | | | Methanol peak | | |
|---|---|---|---|---|---|---|
| **Molecule** | $\boldsymbol{T}$ (K) | $\boldsymbol{N_{obs}}$ ($cm^{-2}$) | $\boldsymbol{\chi_{obs}}$ | $\boldsymbol{T}$ (K) | $\boldsymbol{N_{obs}}$ ($cm^{-2}$) | $\boldsymbol{\chi_{obs}}$ |
| $CH_3OH$ A | 10.0 | $4.71^{+0.03}_{-0.04} \cdot 10^{12}$ | $1.34^{+0.23}_{-0.17} \cdot 10^{-10}$ | 10.0 | $(5.48 \pm 0.04) \cdot 10^{12}$ | $5.7^{+0.6}_{-0.5} \cdot 10^{-10}$ |
| $CH_3OH$ E | 10.0 | $4.6^{+3.3}_{-0.7} \cdot 10^{12}$ | $1.4^{+0.9}_{-0.3} \cdot 10^{-10}$ | 10.0 | $(5.6 \pm 0.3) \cdot 10^{12}$ | $5.9^{+0.7}_{-0.6} \cdot 10^{-10}$ |
| $CH_3OH$ | 10.0 | $9.3^{+3.3}_{-0.7} \cdot 10^{12}$ | $2.84^{+0.91}_{-0.52} \cdot 10^{-10}$ | 10.0 | $(1.11 \pm 0.03) \cdot 10^{13}$ | $1.160^{+0.135}_{-0.113} \cdot 10^{-9}$ |
| $CH_3O$ | $10 \pm 4$ | $(2.8 \pm 0.9) \cdot 10^{11}$ | $7.95^{+2.89}_{-2.48} \cdot 10^{-12}$ | $7 \pm 4$ | $(1.8 \pm 0.6) \cdot 10^{11}$ | $1.92^{+0.68}_{-0.63} \cdot 10^{-11}$ |
| $CH_3OCHO$ | 7.7 | $< 9 \cdot 10^{11}$ | $< 4.3 \cdot 10^{-11}$ | 9.7 | $< 1.0 \cdot 10^{12}$ | $< 1.45 \cdot 10^{-10}$ |
| $CH_3OCH_3$ | 7.7 | $< 1.0 \cdot 10^{12}$ | $< 4.7 \cdot 10^{-11}$ | 9.7 | $< 5 \cdot 10^{11}$ | $< 6.5 \cdot 10^{-11}$ |
| $CH_3CHO$ | 7.7 | $< 2.5 \cdot 10^{11}$ | $< 1.13 \cdot 10^{-11}$ | 9.7 | $(2.1 \pm 0.4) \cdot 10^{11}$ | $2.16^{+0.48}_{-0.43} \cdot 10^{-11}$ |
| t-HCOOH | 7.7 | $< 3 \cdot 10^{12}$ | $< 1.49 \cdot 10^{-10}$ | 9.7 | $< 1.9 \cdot 10^{12}$ | $< 2.8 \cdot 10^{-10}$ |
| c-$C_3H_2O$ | 7.7 | $< 1.5 \cdot 10^{10}$ | $< 7.6 \cdot 10^{-13}$ | 9.7 | $< 5 \cdot 10^{10}$ | $< 7.3 \cdot 10^{-12}$ |
| $H_2CCO$ | $7.7 \pm 1.0$ | $(8.4 \pm 1.3) \cdot 10^{11}$ | $2.41^{+0.54}_{-0.46} \cdot 10^{-11}$ | $10 \pm 3$ | $(7.2 \pm 1.9) \cdot 10^{11}$ | $7.57^{+2.27}_{-2.07} \cdot 10^{-11}$ |
| CCCO | 7.7 | $< 2.4 \cdot 10^{11}$ | $< 1.11 \cdot 10^{-11}$ | 9.7 | $< 1.2 \cdot 10^{12}$ | $< 1.71 \cdot 10^{-10}$ |
| HCCCHO | 7.7 | $< 1.6 \cdot 10^{11}$ | $< 7.6 \cdot 10^{-12}$ | 9.7 | $< 1.9 \cdot 10^{11}$ | $< 2.8 \cdot 10^{-11}$ |
| HCCNC | 6.7 | $(2.4 \pm 1.0) \cdot 10^{11}$ | $6.9^{+3.3}_{-3.0} \cdot 10^{-12}$ | 5.3 | $(1.9 \pm 0.8) \cdot 10^{11}$ | $1.92^{+0.89}_{-0.82} \cdot 10^{-11}$ |
| $CH_2CHCN$ | 6.7 | $< 4 \cdot 10^{10}$ | $< 1.84 \cdot 10^{-12}$ | 5.3 | $< 3 \cdot 10^{10}$ | $< 4.7 \cdot 10^{-12}$ |
| $CH_3NC$ | 6.7 | $(1.9 \pm 0.9) \cdot 10^{10}$ | $5.27^{+2.83}_{-2.47} \cdot 10^{-13}$ | 5.3 | $< 2.3 \cdot 10^{10}$ | $< 3.4 \cdot 10^{-12}$ |
| $CH_3CN$ | 10.0 | $(2.1 \pm 0.3) \cdot 10^{11}$ | $6.06^{+1.32}_{-1.09} \cdot 10^{-12}$ | 10.0 | $< 1.4 \cdot 10^{11}$ | $< 2.10 \cdot 10^{-11}$ |
| HCCCN | 10.0 | $(5.16 \pm 0.04) \cdot 10^{12}$ | $1.471^{+0.250}_{-0.180} \cdot 10^{-10}$ | 10.0 | $(3.72 \pm 0.09) \cdot 10^{12}$ | $3.88^{+0.44}_{-0.37} \cdot 10^{-10}$ |

**Notes.** Temperatures ($T$) refer to excitation temperatures ($T_{ex}$ ) for all the species except for methanol ($CH_3OH$), cyanoacetilene (HCCCN) and acetonitrile ($CH_3CN$), where they refer to kinetic temperatures ($T_{kin}$ ). We used MADCUBA to derive the molecular parameters from the observations except for methanol, cyanoacetilene and acetonitrile, where we used RADEX. Molecular abundances were calculated using an $H_2$ column density of $(3.5 \pm 0.5) \times 10^{22}\,cm^{-2}$ for the dust continuum peak and of $(9.6 \pm 1.0) \times 10^{21}\,cm^{-2}$ for the position of the methanol peak. For the non-detections and also for some detections, we had to fix the excitation temperature ($T_{ex}$ ) so that MADCUBA could fit the column density ($N_{obs}$ ).