

Table 5
Synopsis of Derived Column Densities and Inferred Results

Source Designation	v_{LSR} range (km s ⁻¹)	$N(\text{ArH}^+)$ (10 ¹² cm ⁻²)	$N(\text{p-H}_2\text{O}^+)$ (10 ¹² cm ⁻²)	$N(\text{OH}^+)$ (10 ¹³ cm ⁻²)	$N(\text{OH})$ (10 ¹⁴ cm ⁻²)	$N(\text{SH})^{\text{a}}$ (10 ¹³ cm ⁻²)	$N(\text{CH})$ (10 ¹³ cm ⁻²)
W3(OH)	-51 to -39 ^d	...	...	>0.73	>4.67	>6.70	>6.48
	-25 to -8	...	0.21 ^{+0.25} _{-0.13}	3.03 ^{+1.60} _{-1.10}	0.90 ^{+0.12} _{-0.12}	<0.10	3.14 ^{+0.30} _{-0.30}
	-8 to +9	...	0.91 ^{+0.80} _{-0.55}	3.86 ^{+2.30} _{-1.70}	1.41 ^{+0.57} _{-0.28}	<0.10	4.60 ^{+0.70} _{-0.66}
W3 IRS5	-55 to -35 ^d	>0.01	...	>0.06	>9.02	>1.10	>9.60 _s
	-28 to -8	0.51 ^{+0.16} _{-0.19}	...	2.22 ^{+1.43} _{-0.97}	0.75 ^{+0.05} _{-0.05}	<0.09	2.67 ^{+1.22} _{-1.22}
	-8 to +10	0.27 ^{+0.08} _{-0.08}	0.21 ^{+0.22} _{-0.14}	3.48 ^{+2.00} _{-1.64}	0.51 ^{+0.10} _{-0.07}	<0.10	1.50 ^{+1.40} _{-1.00}
NGC 7538 IRS1	-65 to -39 ^d	...	...	>0.93	>10.44	>22.00	>55.68
	-39 to -31	...	...	0.35 ^{+0.04} _{-0.03}	...	<0.05	0.02 ^{+0.02} _{-0.01}
	-31 to -20	...	...	0.28 ^{+0.05} _{-0.05}	0.14 ^{+0.10} _{-0.02}	<0.07	0.83 ^{+0.60} _{-0.40}
	-17 to -3	...	...	1.01 ^{+0.40} _{-0.31}	0.43 ^{+0.22} _{-0.16}	<0.13	5.96 ^{+1.60} _{-1.60}
	-3 to +18	...	...	1.86 ^{+0.62} _{-0.54}	0.45 ^{+0.08} _{-0.05}	<0.09	2.82 ^{+0.37} _{-0.26}
Source Designation	v_{LSR} range (km s ⁻¹)	$N(\text{H})^{\text{b}}$ (10 ²¹ cm ⁻²)	$N(\text{H}_2)^{\text{c}}$ (10 ²¹ cm ⁻²)	$N(\text{C}^+)$ (10 ¹⁷ cm ⁻²)	$N(\text{O})$ (10 ¹⁸ cm ⁻²)		
W3(OH)	-51 to -39 ^d	1.30 ^{+0.02} _{-0.02}	>1.85	>23.00	>5.57		
	-25 to -8	1.39 ^{+0.03} _{-0.03}	0.90 ^{+0.54} _{-0.37}	5.51 ^{+0.40} _{-0.40}	1.26 ^{+0.68} _{-0.63}		
	-8 to +9	0.95 ^{+0.03} _{-0.03}	1.31 ^{+0.81} _{-0.55}	4.80 ^{+0.57} _{-0.42}	2.00 ^{+1.56} _{-1.08}		
W3 IRS5	-55 to -35 ^d	>2.60	>2.74	>5.96	>2.21		
	-28 to -8	1.20 ^{+0.26} _{-0.26}	0.76 ^{+0.57} _{-0.46}	6.75 ^{+2.43} _{-2.04}	0.83 ^{+0.46} _{-0.34}		
	-8 to +10	0.97 ^{+0.21} _{-0.21}	0.42 ^{+0.46} _{-0.32}	8.00 ^{+3.06} _{-2.40}	1.15 ^{+0.63} _{-0.52}		
NGC 7538 IRS1	-65 to -39 ^d	...	>16.00	>0.69	>8.24		
	-39 to -31	...	0.01 ^{+0.01} _{-0.01}	...	0.05 ^{+0.02} _{-0.02}		
	-31 to -20	...	0.23 ^{+0.21} _{-0.14}	...	...
	-17 to -3	2.96 ^{+0.03} _{-0.03}	1.70 ^{+1.12} _{-0.82}	9.80 ^{+2.70} _{-2.00}	1.01 ^{+0.82} _{-0.70}		
	-3 to +18	1.99 ^{+0.05} _{-0.05}	0.81 ^{+0.50} _{-0.33}	3.33 ^{+0.71} _{-0.54}	0.42 ^{+0.27} _{-0.11}		

Notes.

- ^a Represents the 3 σ upper limits on $N(\text{SH})$ obtained toward line-of-sight material not associated with the background source for which we do not detect SH.
^b The H I data toward W3(OH) and W3 IRS5 are extracted from the Canadian Galactic Plane Survey (CGPS; Taylor et al. 2003), and that toward NGC 7538 IRS1 is taken from Lebrón et al. (2001).
^c $N(\text{H}_2)$ values were derived using $N(\text{CH})$ following the relationship determined by Sheffer et al. (2008), $N(\text{CH})/N(\text{H}_2) = 3.5^{+2.1}_{-1.4} \times 10^{-8}$.
^d Indicates the velocity intervals corresponding to the molecular cloud.