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Systematic differences of excitation temperatures between DNC and $HN^{13}C$

西村優里，坂井南美、渡邉祥正、酒井剛（東京大学）、廣田朋也（NAOJ）、山本智（東京大学）

We have conducted observations of the ground-state transition lines ($J = 1-0$) of the fundamental deuterated species DCO^+, DNC, DCN, CCD, N_2D^+ as well as those of $H^{13}CO^+$, $HN^{13}C$, $H^{13}CN$, CCH and N_2H^+ with the Nobeyama 45 m telescope using the newly installed receiver T70. Since the HCO^+, HNC and HCN lines are optically thick, we have observed ^{13}C isotope species of these molecules to derive their column densities. The target sources are the cold starless cores, TMC-1 and Lupus-1A, and the star formation cores, L1527 and IRAS 15398-3359. The hyperfine components appear in all four sources for $HN^{13}C$ and in three sources for DNC. We made the LTE fits to determine T_{ex}, τ, v_{LSR}, Δv. We evaluate the deuterium fractionation ratio by assuming the interstellar $^{12}C/^{13}C$ ratio of 60. As a result, $DNC/HN^{13}C$ ratio is found to be 9.1 % in TMC-1, 1.9 % in Lupus-1A, 2.3 % in L1527 and 5.1 % in IRAS 15398-3359. We have found that the excitation temperatures are systematically different between DNC and $HN^{13}C$ in the all four sources. The results of our LVG calculations support this trend. It can be interpreted by the different Einstein coefficients between the DNC and $HN^{13}C$ lines, as well as the different distribution of these two species.