P137a Investigation of ^{13}C Isotopic Fractionation of CCH in L1521B and L134N

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Unsaturated carbon-chain molecules are representative species in dark clouds, and they account for around 40% of the ≈ 200 molecules detected in the interstellar medium and circumstellar shells. Hence, it is important for astrochemists to understand carbon-chain chemistry. One of the methods to study carbon-chain chemistry is observations of their ^{13}C isotopic fractionation. We have carried out observations of CCH and its two ^{13}C isotopologues, ^{13}CCH and C^{13}CH, in the 84 – 88 GHz band toward two low-mass starless cores, L1521B and L134N, using the Nobeyama 45-m radio telescope. The lines of C^{13}CH have been detected with a signal-to-noise ratio of 4, whereas no ^{13}CCH line was detected in either dark cloud. The N(C^{13}CH)/N(^{13}CCH) ratios were derived to be > 1.1 and > 1.4 in L1521B and L134N, respectively. The characteristic that C^{13}CH is more abundant than ^{13}CCH is likely common for dark clouds. We also find that the ^{12}C/^{13}C ratios of CCH in L1521B are higher than those of HC_3N by more than a factor of 2, as well as Taurus Molecular Cloud-1 (TMC-1). In L134N, the difference in the ^{12}C/^{13}C ratio between CCH and HC_3N appears to be smaller than those found in L1521B and TMC-1. We investigate possible routes that cause the significantly high ^{12}C/^{13}C ratio of CCH especially in young dark clouds, with the help of chemical simulation. The extremely high ^{12}C/^{13}C ratio of CCH seems to be caused by the reactions between small hydrocarbons (e.g., CCH, C_2H_2, $l, c-C_3H$) and C^+.