Detections of Long Carbon Chains CH$_3$CCCCH, C$_6$H, *linear*-C$_6$H$_2$ and C$_7$H in the Low-Mass Star Forming Region L1527

*Mitsunori Araki$^1$, Shuro Takano$^2$, Nami Sakai$^3$, Satoshi Yamamoto$^4$, Takahiro Oyama$^1$, Nobuhiko Kuze$^5$, Koichi Tsukiyama$^1$

1. Department of Chemistry, Faculty of Science Division I, Tokyo University of Science, 2. Nihon University, 3. RIKEN, 4. The university of Tokyo, 5. Sophia University

A richness of long carbon chains in the warm carbon chain chemistry (WCCC) region has been searched in the 42-44 GHz region by using Green Bank 100 m telescope. Long carbon chains C$_7$H, C$_6$H, CH$_3$C$_4$H, and *linear*-C$_6$H$_2$ and cyclic species C$_3$H and C$_3$H$_2$O have been detected in the low-mass star forming region L1527, performing the WCCC. The detection of C$_7$H is for the first time in molecular clouds. While the abundance ratios of carbon chains in between L1527 and the starless dark cloud Taurus Molecular Cloud-1 Cyanopolyyne Peak (TMC-1 CP) have a trend of decrease by extension of carbon-chain length, column densities of CH$_3$C$_4$H and C$_6$H are on the trend. However, the column densities of *linear*-C$_6$H$_2$, and C$_7$H are as abundant as those of TMC-1 CP in spite of long carbon chain, i.e., they are not on the trend. The abundances of *linear*-C$_6$H$_2$ and C$_7$H show that L1527 is rich for long carbon chains as well as TMC-1 CP.

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