

P40a 低質量星形成領域 L1527 における炭素鎖分子の高分解能観測

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L1527 is a low-mass star forming region showing extremely high abundances of carbon-chain molecules. In this source, carbon-chain molecules would be regenerated in a lukewarm region near the protostar, triggered by the evaporation of the CH₄ ice. This is new carbon-chain chemistry (Warm Carbon-Chain Chemistry: WCCC) in contrast to the conventional one which has long been applied to cold starless cores. Recently, we have observed carbon-chain molecules in L1527 with PdBI. The distributions show clear central condensation around the protostar, confirming that these molecules are associated with the protostar environment. The blue and red shifted components are concentrated near the protostar, indicating their existence in an infalling envelope. The intensity distributions show a steep increase at the radius of 500–1000 AU from the protostar. The abundances of carbon-chain molecules are found to be enhanced by a factor of 10 inward of the increasing point, where the temperature becomes higher than 20-30 K. This result is consistent with the WCCC, because the evaporation temperature of CH₄ is about 25 K. On the other hand, the distributions have a slight dip with a radius of 300-600 AU toward the protostar position, indicating that their abundances would decrease toward the central part. The present results provide a new picture of regeneration and destruction of carbon-chain molecules in the closest vicinity of a low-mass protostar.