DETECTION OF CH$_3$NCO IN THE GALACTIC CENTER STAR-FORMING REGION SAGITTARIUS B2(M) BY RADIO ASTRONOMICAL OBSERVATIONS

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Large difference of chemical compositions between molecular clouds and comets is a big question for astrochemistry. The case of a pre-biotic molecule CH$_3$NCO is one of them. The abundance ratio of [CH$_3$NCO]/[HNCO] is high in the comet 67P (>4, [1]), although it is low (0.02 – 0.3, e.g., [2]) in molecular clouds. An abundance of CH$_3$NCO is expected to be held and/or increased during evolutionary process of a cloud. A pair of an old core and a young core having the similar chemical compositions needs to be investigated for this evolutionary process. In this work, we aimed to detect CH$_3$NCO in the middle (M) core, which is relatively older than the north (N) core, in the Galactic Center star-forming region Sagittarius B2 with the 45 m telescope of Nobeyama Radio Observatory. The rotational transitions of $J = 10 \rightarrow 9$ to $13 \rightarrow 12$ for CH$_3$NCO were detected in the 85 – 114 GHz region. The column density and the rotational temperature are derived to be $N = (4.3 \pm 2.1) \times 10^{13}$ cm$^{-2}$ and $T_{rot} = (32 \pm 9)$ K, respectively, assuming local thermal equilibrium. Similarly, an abundance of HNCO is estimated to be $N = (1.3 \pm 0.5) \times 10^{15}$ cm$^{-2}$ ($T_{rot} = 21 \pm 2$ K), giving the ratio of [CH$_3$NCO]/[HNCO] = 0.032. Thus, as a simplest model, it is suggested that an abundance of CH$_3$NCO is held during evolutionary process of the Sagittarius B2 region.