

DETECTION OF CH₃CN IN THE ENVELOPE AROUND SAGITTARIUS B2(N)

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Traditionally used model of evolution of molecular clouds in interstellar space is described as increasing of cloud gas density from diffuse to dense conditions, i.e., from an atomic-gas cloud to a star-forming region via a diffuse cloud and a dense cloud. However, reverse evolution of molecular clouds is suggested by Price et al. [1]. For example, outflow from a star-forming region makes a relatively-low-density cloud. To find a clue of reverse evolution, investigation of chemical composition of relatively-low-density clouds is necessary. Rotational transitions of CH₃CN can be observed by absorption, and they can be analyzed by using a model of the hot axis effect, which shows special rotational distributions of CH₃CN in a relatively-low-density cloud [2]. In our previous work, CH₃CN was detected via absorption lines of the $J = 4-3$ rotational transition in the envelope of Sagittarius B2(M) core in the Galactic Center region by using Nobeyama 45-m telescope [3]. In this work, using ALMA data archive [4], we investigated absorption lines of the $J = 5-4$ and $6-5$ rotational transitions of CH₃CN in the envelope of Sagittarius B2(N) core, which is an adjacent core of the (M) core. The column density of CH₃CN in the envelope of the (N) core is derived to be $(1.0 \pm 0.2) \times 10^{15} \text{ cm}^{-2}$, which is 7 times larger than that in the envelope of the (M) core, while the (N) core has an 11-times larger column density than the (M) core [5]. Similar abundance relation was found in the case of HC₃N. Thus, as chemical compositions of relatively-low-density clouds, it was found that an abundant core has an abundant envelope and vice versa in the Sagittarius B2 region. To investigate reverse evolution, we will analyze additional molecules from now on.

[1] Price et al., 2003, MNRAS, 343, 1257. [2] Araki et al., *Astronomical Journal*, 148, 87 (2014). [3] Araki et al., *JpGU* 2018, PPS09-01. [4] Project Code: 2016.1.00074.S. [5] Belloche et al., 2013, A&A, 559, 47