

The prebiotic chemistry of Enceladus' hydrothermal systems

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Enceladus is one the sixth-largest moon of the moons of Saturn, and it has been known to harbor interior ocean beneath the icy crust, which holds important factors necessary for life such as organic compounds, liquid water, and high-temperature condition. While geochemical and other radiation-related processes for the *in situ* production of organics remain elusive, thermally unaltered carbonaceous chondrites, consisting of the main body of Enceladus are known to be enriched with organic matters such as simple amino acids. Due to these characteristics, Enceladus is attracting attention as a habitable area for primitive life, and the prebiotic chemical evolution that occurs in Enceladus ocean is under discussion. Chemical evolution is an abiotic reaction process in which complex organic molecules arise from a combination of simple inorganic and organic chemical compounds. To assess the ongoing chemical evolution at the subsurface ocean of Enceladus, we focused to explore the water-rock reaction and the possibility of peptide formation under the Enceladus hydrothermal environment. We reported that ongoing chemical evolution on Enceladus is likely producing short abiotic peptides from simple amino acids on the porous core surface. Here we show that Enceladus' unique chemical condition linking to prebiotic evolution based on our published report and the latest findings for Enceladus.

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