

The possibilities for life on Titan - the constraints for methanogenic bacteria with acetylene-based metabolic pathways

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Previous studies have discussed the possibilities for methanogenic bacteria (Methanogens) on Titan. These bacteria were assumed to use chemical reactions which emitted methane to the environment of Titan. We focused on one of these reactions ($C_2H_2 + H_2 \rightarrow 2CH_4$), which hydrogenates acetylene. We calculated the Gibbs free energy which can be obtained from this reaction under the environmental conditions (e.g., temperature and pressure) of Titan. We also discussed the possibilities for these bacteria to survive under the kinetic constraints on Titan applying the method proposed by Seto [2014].

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