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星間塵表面におけるエタノール重水素濃集の可能性：H-D トンネル置換反応実験
Importance of deuterium fractionation of ethanol by grain surface reactions: experiment of H-D tunneling substitution

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Since we have demonstrated the importance of tunneling grain surface reactions in deuterium fractionation of molecules, many works have targeted this process. To date, we have shown that the grain surface reactions play a crucial role in deuterium enrichments of water, formaldehyde, methanol, and methylamine. In this talk, we present the results of experiment on H-D substitution tunneling reactions of ethanol on cryogenic surfaces. Although C_2H_5OH was observed toward interstellar clouds, its deuterated species have not been detected. However, it was found that its homologous, CH_3OH can be highly deuterated by H-D substitution reactions on grain surfaces and thus it should be reasonable to focus on the potential importance of this process for ethanol. We demonstrated that deuterated methanol is efficiently produced by tunneling reaction of H atoms at very low temperatures relevant to grain surfaces in clouds. H-D reactions predominantly occur in CH_3-CH_2- groups but were hardly observed in an ?OH group which is consistent with the methanol case.

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