

OBSERVATION OF METASTABLE AUTODETACHING STATES OF METHIDE, CH_3^- ^a

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Metastable autodetaching states of methide, CH_3^- , have been observed, with an autodetachment lifetime of tens to hundreds of μs . The excited state responsible for autodetachment is unknown, but could be a vibrationally excited state, because one vibrational quantum of the ν_1 , ν_3 , or ν_4 vibrational mode has enough internal energy to produce autodetachment of the low-electron -affinity (0.08 eV) ion. The long lifetime may arise from small Frank-Condon overlap between the initial pyramidal ion and the final planar neutral. There are presently no theoretical calculations of the autodetachment mechanism or lifetimes.

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