

Temperature dependence of muon transfer rates from $t\mu$ to ${}^3\text{He}$ in solid T_2

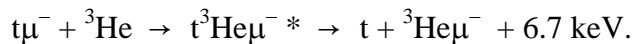
T. Matsuzaki^a, K. Ishida^a, H. Imao^a, Y. Matsuda^a, N. Kawamura^b,
M. Iwasaki^a and K. Nagamine^{a,b,c}

^aRIKEN, 2-1 Hirosawa, Wako, Saitama, 351-0198 Japan

^bKEK 1-1 Oho, Tsukuba, Ibaraki, 305-0801 Japan

^cUniversity of California Riverside, Riverside, California 92521, U.S.A.

RIKEN have conducted muon catalyzed t-t fusion experiments with solid T_2 targets at the RIKEN-RAL Muon Facility in the UK. Muon catalyzed t-t fusions ($t\text{-}t\ \mu\text{CF}$) take place spontaneously by stopping negative muons in a tritium target. The negative muons form $t\mu$ atoms, and the $t\mu$ atoms then collide with T_2 molecules to form $tt\mu$ molecules. The t-t fusions occur in the $tt\mu$ molecules to induce three-particle decay as shown in a figure. In the themarization process, $t\mu$ atoms also collide with ${}^3\text{He}$ atoms accumulated in solid T_2 targets, and muons transfer from $t\mu$ to ${}^3\text{He}$ atom through intermediate ($t{}^3\text{He}\mu^-$) mesomolecule formation with 6.7 keV photon emissions, describes as



The muon transfer rates were measured by observing time dependent changes of t-t μCF neutron disappearance rates as a function of time elapsed after ${}^3\text{He}$ removal. We have obtained the muon transfer rates in the range from 5K to 20K, and observed an interesting temperature dependence. The muon transfer process is considered to be closely connected with $t\mu$ themarization, collision cross section and lattice structure of solid T_2 at various temperatures. The experimets, results and our understanding will be reported.

