

EXCITED STATE DYNAMICS OF ELECTRONICALLY-EXCITED UF_6 IN THE PRESENCE OF ADDED GASES

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The removal of $^*\text{UF}_6$ (A-state) molecules by selected alkanes has been investigated at 25°C . The following rate constants (units of 10^{11} $\ell/\text{mol}\cdot\text{s}$) were evaluated: *iso*- C_4F_{10} , 0.0432 ± 0.0115 ; *n*- C_4F_{10} , 0.0764 ± 0.020 ; C_2F_6 , 0.0192 ± 0.0052 ; CH_4 , 0.0612 ± 0.0061 ; C_2H_6 , 3.78 ± 0.60 ; C_3H_8 , 5.08 ± 0.60 ; *n*- C_6H_{10} , 5.05 ± 0.78 ; *iso*- C_6H_{10} , 4.17 ± 1.15 ; *neo*- C_6H_{12} , 6.59 ± 0.93 ; $\text{CF}_3\text{-CH}_3$, 0.0385 ± 0.0056 ; $\text{CF}_2\text{H-CF}_2\text{H}$, 0.0729 ± 0.0074 ; and $\text{CF}_2\text{H-CF}_2\text{H}$, 0.149 ± 0.015 . The perfluoro-alkane quenching of $^*\text{UF}_6$ proceeds via physical mechanism. The other alkane quenching reactions are consistent with a chemical mechanism which involves removal of two hydrogens from the alkane. Representative Stern-Volmer plots are depicted in the figure below.

