# LIFETIME SATURATION OF $SO_2$ ($^3B_1$). EVALUATION OF THE PARTITIONING OF CHEMICAL AND PHYSICAL QUENCHING. APPLICATION TO ALKANES

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Lifetime data at 25°C and 393.5 nm excitation have been obtained for the decay of $SO_2(^3B_1)$ molecules in the presence of high pressures of $CH_4$, $C_2H_6$, and $C_3H_8$. At high pressures the physical quenching channel saturates and a kinetic model which incorporates this effect has been applied to the $SO_2$, alkane systems studied. This model permits one to evaluate the partitioning of the total quenching rate constants into their chemical and physical components.

The data are summarized in the table below:

Chemical, $k_c$, and Physical, $k_p$, Quenching Constants for the Removal of $SO_2(^3B_1)$ by Alkanes (RH).[a]

| RH | $k_c$ $(torr^{-1}s^{-1})$ | $k_p$ $(torr^{-1}s^{-1})$ |
|---|---|---|
| $CH_4$ | $1.80 \times 10^2$ | $4.70 \times 10^3$ |
| $C_2H_6$ | $1.66 \times 10^3$ | $7.70 \times 10^3$ |
| $C_3H_8$ | $1.25 \times 10^4$ | $6.50 \times 10^2$ |

[a] The $k_p$ value represents the zero pressure physical quenching rate constant.