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$O(^3P) + C_2(^1\Sigma_g^+) \rightarrow CO(^1\Sigma_g) + C(^3P)$ (1)

Thermodynamic Data

$\Delta H^o_{298}(1) = -480.8$ kJ mol^{-1}

Thermochemical data are taken from ref. (*)

Rate Coefficient Data *k*

k / cm^3 molecule^{-1} s^{-1}	T / K	Reference	Comments
Rate Coefficient Measurements			
The only measurement that I can find (NIST database) is a shock tube study dating from 1969 giving a rate constant (6×10^{-10} cm^3 molecule^{-1} s^{-1}) at 8000 K.			
Reviews and Evaluations			
Nothing given for this reaction		Baulch *et al.*, 2005	(*)
1.0×10^{-10}	10 – 300	UMIST database	
1.0×10^{-10}	no T-dependence	OSU website	

Comments

This reaction is highly exothermic and spin-allowed. I think that it is likely to be very fast. Unfortunately there are no measurements even at room temperature, never mind lower. It could probably be studied using the combined flowtube/pulsed photolysis used to study O + OH and N + OH but no-one has attempted this.

Preferred Values

$k(298\text{ K}) = 2.0 \times 10^{-10}$ cm^3 molecule^{-1} s^{-1}
$k(10\text{ K}) = 3.0 \times 10^{-10}$ cm^3 molecule^{-1} s^{-1}
$k(T) = 2.0 \times 10^{-10} (T/300)^{-0.12}$ cm^3 molecule^{-1} s^{-1}

Reliability

$\Delta \log k_1$ (298 K) = ± 0.5
$\Delta \log k_1$ (10 K) = ± 0.5
$F_0 = 3$; $g = 0$

Comments on Preferred Values

I recommend values higher than those in the UMIST and Ohio databases but give wide uncertainties (factor of 3).

References

(*) D. L. Baulch *et al.*, J. Phys. Chem. Ref. Data **34**, 575 (2005).