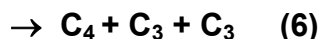
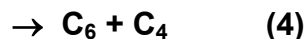
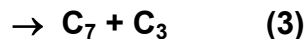
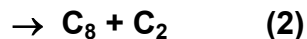


Authors: Marin Chabot & Karine Béroff (Orsay)



Thermodynamic Data

$$\Delta H^{\circ}_0 (1) = - 163 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0 (2) = - 134 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0 (3) = - 308 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0 (4) = - 144 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0 (5) = - 308 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0 (6) = + 192 \text{ kJ mol}^{-1}$$

$$\text{Ionisation Potential} = 887 \text{ kJ mol}^{-1} = 9.10 \text{ eV}$$

Thermochemical data have been obtained with $\Delta H^{\circ}_0 = \text{DE-IP}$. DE from Raghavachari (1987), IP (vertical) from Belau et al (2007) (estimated error bars 0.1). Estimated error bars on ΔH values: $\sim 60 \text{ kJ mol}^{-1}$

Rate Coefficient Data

$k / \text{cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$	T / K	Reference	Comments
<i>Rate Coefficient Measurement</i>			
<i>None</i>			
<i>Reviews and Evaluations</i>			
$2.0 \times 10^{-6}(T/300)^{-0.3}$		OSU09 website	(a)
$2.0 \times 10^{-6}(T/300)^{-0.3}$	10-300	UMIST06 database	(a)
<i>Branching Fraction Measurement</i>			
(1) = 0.01 (± 0.005)		Chabot 2006, 2010	(b)
(2) = 0.01 (± 0.005)			
(3) = 0.70 (± 0.03)			
(4) = 0.03 (± 0.01)			
(5) = 0.25 (± 0.02)			
<i>Branching fraction Reviews and Evaluations</i>			
(1) = (2) = 0.5; (3) = (4) = (5) = 0.0		OSU09 website	
(1) = (2) = 0.5; (3) = (4) = (5) = 0.0	10-300	UMIST06 database	

Comments

(a) OSU and UMIST estimations for reaction rates and branching fractions are from Herbst & Leung (1989). Lognormal factor 1.25 of accuracy is reported.

(b) Measurements have been performed with High Velocity Collision experiments on hot (3000°K) C₁₀⁺ clusters produced by a sputtering source and capturing an electron from an atom. Results have been interpreted satisfactorily within a statistical fragmentation behaviour (Martinet, 2004). Derivation of these experimental results in astrochemical context assumes that statistical fragmentation occurs under DR process (Chabot 2010).

Preferred Values

Rate constant:

$$k = 2 \times 10^{-6} (T/300)^{-0.3} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$$

Reliability of rate constant:

$$F_0=2; g=0$$

Recommended Branching Fractions:

$$(1) = (2) = (4) = 0.00$$

$$(3) = 0.75$$

$$(5) = 0.25$$

Reliability of Branching Fractions:

$$\pm 0.1 \text{ (uniform)}$$

References

- K.Raghavachari & J.Binkley (1987) JCP**87**(4), 2191
- L. Belau et al (2007) JACS **129**, 10229
- M. Chabot et al, (2006) J. Phys. B **39** 2593
- M. Chabot et al, (2010) A&A **524**, A39 (2010)
- E. Herbst & C.L. Leung, (1989) APJS **69**, 271
- G. Martinet et al, (2004) Phys.Rev.Lett. **93**, 063401