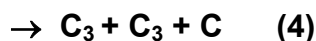
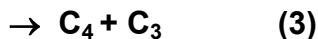
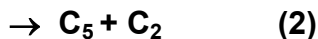


Authors: Marin Chabot & Karine Béroff (Orsay)



Thermodynamic Data

$$\Delta H^{\circ}_0(1) = -363 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0(2) = -413 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0(3) = -441 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0(4) = +23 \text{ kJ mol}^{-1}$$

$$\text{Ionisation potential} = 973 \text{ kJ mol}^{-1} = 10.10 \text{ eV}$$

Thermochemical data have been obtained with $\Delta H^{\circ}_0 = \text{DE} - \text{IP}$. DE from Diaz-Tendero et al (2006), 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>			
Channels (1) + (2)			
$2.0 \times 10^{-6}(\text{T}/300)^{-0.3}$		OSU09 website	(a)
$2.0 \times 10^{-6}(\text{T}/300)^{-0.3}$	10-300	UMIST06 database	(a)
Channel (3)			
$1.0 \times 10^{-7}(\text{T}/300)^{-0.5}$		OSU09 website	(a)
$1.0 \times 10^{-7}(\text{T}/300)^{-0.5}$	10-300	UMIST06 database	(a)
<i>Branching Fraction Measurements</i>			
(1) = 0.01 (± 0.005)		Chabot 2006, 2010	(b)
(2) = 0.19 (± 0.02)			
(3) = 0.80 (± 0.04)			
<i>Branching fraction Reviews and Evaluations</i>			
		OSU09 website	(a)
		UMIST06 database	(a)

Comments

(a) OSU and UMIST estimations for reaction rates are from the pioneer paper of Herbst &

Leung (1989). Temperature dependence is not the same between channels (1), (2) and channel (3) without any explanation. Lognormal factor 1.25 of accuracy is reported.

(b) Measurements have been performed with High Velocity Collision experiments on hot (3000°K) C_7^+ 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:

$$(1) = 0.0$$

$$(2) = 0.20$$

$$(3) = 0.80$$

Reliability of Branching Fractions:

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

References

- S. Diàz-Tendero et al (2006), Int.J.Mass.Spectr. **252**, 126
- 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