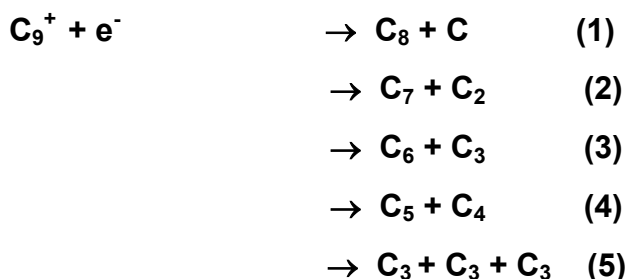


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*Thermodynamic Data*

$$\Delta H^{\circ}_0 (1) = - 296 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0 (2) = - 344 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0 (3) = - 433 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0 (4) = - 371 \text{ kJ mol}^{-1}$$

$$\Delta H^{\circ}_0 (5) = - 48 \text{ kJ mol}^{-1}$$

$$\text{Ionisation Potential} = 907 \text{ kJ mol}^{-1} = 9.40 \text{ eV}$$

Thermochemical data have been obtained with  $\Delta H^{\circ}_0 = \text{DE-IP}$ . DE from Diaz-Tendero et al (2006), IP (vertical) from Belau et al (2007) (estimated error bars 0.1). Estimated error bars on  $\Delta H$  values:  $\sim 60 \text{ kJ mol}^{-1}$

**Rate Coefficient Data**

$k / \text{cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$	$T / \text{K}$	Reference	Comments
<i>Rate Coefficient Measurement</i>			
<i>None</i>			
<i>Reviews and Evaluations</i>			
$2.0 \times 10^{-6}(\text{T}/300)^{-0.3}$		OSU09 website	(a)
$2.0 \times 10^{-6}(\text{T}/300)^{-0.3}$	10-300	UMIST06 database	(a)
<i>Branching Fraction Measurement</i>			
(1) = 0.00 ( $\pm 0.005$ )		Chabot 2006, 2010	(b)
(2) = 0.06 ( $\pm 0.01$ )			
(3) = 0.66 ( $\pm 0.02$ )			
(4) = 0.28 ( $\pm 0.015$ )			
<i>Branching fraction Reviews and Evaluations</i>			
(1) = (2) = 0.5; (3) = (4) = 0.0		OSU09 website	
(1) = (2) = 0.5; (3) = (4) = 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)  $\text{C}^+_9$  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:*

$$F0=2; g=0$$

*Recommended Branching Fractions:*

$$(1) = 0.00$$

$$(2) = 0.05$$

$$(3) = 0.65$$

$$(4) = 0.30$$

*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