ADF14: thermal charge exchange coefficients

The data set provides thermally averaged total charge transfer rate coefficients. They are double Maxwell averages over the donor and receiver temperatures. The formatting conventions and variable storage are given below.

Utilising subroutines :

ADAS303

Formatted files to ADF14 specification :

Database Status Date = March 17, 2003 Data type = tcx files Data root = /.../adas/adas/adf14/

Donors	*Receiver/members*	*Prefix*	*Library*	*Comments*	*Quality*	
H0	h, he, be,c,o		tcx#h0	Janev/ORNL,total coeffts		good
	c1,c2,c3,c4,c5,c6	cfm	tcx#h0	Maggi, state selective rate coeffts.	good	
He0	he		tcx#he0	O'Mullane/ORNL	good	

Notes: 1. Total coefficients give the charge exchange recombination coefficient summed over all levels of the receiving ion.

Data lines : *Format:*

NSEL

for ISEL= 1 to NSEL

REACT, NTR , NTD , ATMSD , ATMR , INFO , ISEL

(TIR(ITR), ITR=1,NTR)

(TID(ITD), ITD=1,NTD)

for ITR = 1 to NTR

QCXE , (QCX(ITD,ITR), ITD=1,NTD)

repeat

repeat

variable identification :

name	*meaning*
NSEL	number of reactions available
REACT	specification of reactants (text) (eg. H /BE+2)
NTD	number of donor temperatures
NTR	number of receiver temperatures
ATMSD	atomic mass of donor
ATMR	atomic mass of receiver
INFO	information on data source
ISEL	transition index
TID()	donor temperatures (eV)
TIR()	receiver temperatures (eV)
QCXE	charge exchange rate coefficient (cm**3 sec-1) for equal donor and receiver temperatures
QCX(,)	charge exchange rate coefficient (cm**3 sec-1) 1st parameter donor temperature index 2nd parameter receiver temperature index

Table B14c – example.

```
    3
H + 0 (1)/C + 2 (1)  11  11/AMD=   2.0/AMR=  12.0/FST=2p (2P)   /ISEL=    1
 1.72D-01 3.45D-01 6.90D-01 1.72D+00 3.45D+00 6.90D+00 1.72D+01 3.45D+01
 6.90D+01 1.72D+02 3.45D+02
 *EQUAL** 1.72D-01 3.45D-01 6.90D-01 1.72D+00 3.45D+00 6.90D+00 1.72D+01
 3.45D+01 6.90D+01 1.72D+02 3.45D+02
 6.34D-13 6.34D-13 7.87D-13 8.98D-13 9.58D-13 1.01D-12 6.82D-13 2.90D-13
 1.62D-13 2.78D-13 1.51D-18 1.05D-23
 8.04D-13 6.70D-13 8.04D-13 9.01D-13 9.64D-13 1.01D-12 7.02D-13 3.07D-13
 1.64D-13 2.65D-13 2.01D-18 1.21D-23
 9.10D-13 7.28D-13 8.30D-13 9.10D-13 9.73D-13 1.02D-12 7.37D-13 3.32D-13
 1.70D-13 2.45D-13 3.69D-18 1.61D-23
 9.87D-13 8.30D-13 8.81D-13 9.29D-13 9.87D-13 1.03D-12 8.02D-13 3.73D-13
 1.85D-13 2.09D-13 2.84D-17 4.06D-23
 1.03D-12 9.02D-13 9.24D-13 9.50D-13 1.00D-12 1.03D-12 8.38D-13 3.97D-13
 1.96D-13 1.77D-13 3.73D-16 2.73D-22
 8.27D-13 9.51D-13 9.62D-13 9.81D-13 1.02D-12 1.01D-12 8.27D-13 4.05D-13
 1.98D-13 1.48D-13 2.96D-15 6.27D-20
 3.84D-13 1.02D-12 1.03D-12 1.03D-12 1.01D-12 9.34D-13 7.31D-13 3.84D-13
 1.87D-13 1.13D-13 1.29D-14 8.23D-17
 1.75D-13 9.22D-13 9.18D-13 9.14D-13 8.66D-13 7.63D-13 6.10D-13 3.37D-13
 1.75D-13 9.02D-14 2.29D-14 1.10D-15
 7.41D-14 8.51D-13 7.66D-13 6.77D-13 5.90D-13 5.23D-13 4.31D-13 2.58D-13
 1.49D-13 7.41D-14 2.40D-14 4.86D-15
 2.04D-14 1.68D-13 1.78D-13 1.95D-13 2.22D-13 2.22D-13 1.99D-13 1.43D-13
 9.45D-14 5.55D-14 2.04D-14 9.39D-15
 6.72D-15 2.61D-13 2.33D-13 2.00D-13 1.55D-13 1.25D-13 1.03D-13 7.87D-14
 6.01D-14 3.19D-14 1.69D-14 6.72D-15
H + 0 (1)/C + 2 (1)  11  11/AMD=   2.0/AMR=  12.0/FST=2p2(2D)   /ISEL=    2
 1.72D-01 3.45D-01 6.90D-01 1.72D+00 3.45D+00 6.90D+00 1.72D+01 3.45D+01
 6.90D+01 1.72D+02 3.45D+02
 *EQUAL** 1.72D-01 3.45D-01 6.90D-01 1.72D+00 3.45D+00 6.90D+00 1.72D+01
 3.45D+01 6.90D+01 1.72D+02 3.45D+02
 2.35D-18 2.35D-18 2.96D-18 7.53D-18 1.19D-14 6.70D-13 1.02D-11 1.32D-10
 4.94D-10 1.46D-09 4.25D-09 7.75D-09
 3.05D-18 2.48D-18 3.05D-18 9.45D-18 1.37D-14 7.05D-13 1.03D-11 1.33D-10
 4.95D-10 1.47D-09 4.25D-09 7.75D-09
 1.60D-17 2.71D-18 3.21D-18 1.60D-17 1.78D-14 7.62D-13 1.06D-11 1.34D-10
 4.97D-10 1.47D-09 4.25D-09 7.75D-09
 3.31D-14 3.21D-18 4.56D-18 8.78D-17 3.31D-14 9.21D-13 1.15D-11 1.37D-10
 5.03D-10 1.47D-09 4.26D-09 7.75D-09
 1.25D-12 9.40D-18 5.04D-17 9.48D-16 7.59D-14 1.25D-12 1.30D-11 1.42D-10
 5.12D-10 1.48D-09 4.26D-09 7.76D-09
 1.65D-11 1.40D-15 3.88D-15 1.83D-14 2.61D-13 2.16D-12 1.65D-11 1.52D-10
 5.28D-10 1.49D-09 4.28D-09 7.77D-09
 1.83D-10 3.41D-13 4.58D-13 7.32D-13 2.15D-12 7.27D-12 3.01D-11 1.83D-10
 5.75D-10 1.53D-09 4.32D-09 7.80D-09
 6.50D-10 5.55D-12 6.29D-12 7.73D-12 1.29D-11 2.50D-11 6.17D-11 2.40D-10
 6.50D-10 1.61D-09 4.38D-09 7.85D-09
 1.77D-09 4.92D-11 5.14D-11 5.58D-11 6.93D-11 9.39D-11 1.51D-10 3.66D-10
 8.01D-10 1.77D-09 4.52D-09 7.95D-09
 4.92D-09 3.69D-10 3.73D-10 3.81D-10 4.06D-10 4.47D-10 5.32D-10 8.01D-10
 1.28D-09 2.26D-09 4.92D-09 8.24D-09
 8.70D-09 1.14D-09 1.14D-09 1.15D-09 1.17D-09 1.22D-09 1.31D-09 1.60D-09
 2.09D-09 3.05D-09 5.55D-09 8.70D-09
```

```
H + 0 (1)/C + 2 (1)  11  11/AMD=   2.0/AMR=  12.0/FST=Total     /ISEL=    3
 1.72D-01 3.45D-01 6.90D-01 1.72D+00 3.45D+00 6.90D+00 1.72D+01 3.45D+01
 6.90D+01 1.72D+02 3.45D+02
 *EQUAL** 1.72D-01 3.45D-01 6.90D-01 1.72D+00 3.45D+00 6.90D+00 1.72D+01
 3.45D+01 6.90D+01 1.72D+02 3.45D+02
 6.35D-13 6.35D-13 7.92D-13 9.03D-13 9.86D-13 1.70D-12 1.16D-11 1.32D-10
 5.02D-10 1.45D-09 4.25D-09 7.74D-09
 8.09D-13 6.72D-13 8.09D-13 9.07D-13 9.93D-13 1.72D-12 1.18D-11 1.32D-10
 5.03D-10 1.45D-09 4.25D-09 7.74D-09
 9.15D-13 7.31D-13 8.36D-13 9.15D-13 1.00D-12 1.78D-12 1.21D-11 1.33D-10
 5.04D-10 1.45D-09 4.25D-09 7.74D-09
 1.03D-12 8.36D-13 8.87D-13 9.35D-13 1.03D-12 1.96D-12 1.30D-11 1.36D-10
 5.08D-10 1.46D-09 4.26D-09 7.75D-09
 2.33D-12 9.08D-13 9.30D-13 9.59D-13 1.09D-12 2.33D-12 1.47D-11 1.41D-10
 5.16D-10 1.46D-09 4.27D-09 7.75D-09
 1.84D-11 9.61D-13 9.76D-13 1.01D-12 1.28D-12 3.32D-12 1.84D-11 1.51D-10
 5.30D-10 1.48D-09 4.28D-09 7.76D-09
 1.82D-10 1.38D-12 1.49D-12 1.78D-12 3.31D-12 8.75D-12 3.20D-11 1.82D-10
 5.74D-10 1.53D-09 4.32D-09 7.79D-09
 6.48D-10 7.16D-12 7.82D-12 9.27D-12 1.46D-11 2.70D-11 6.32D-11 2.39D-10
 6.48D-10 1.61D-09 4.38D-09 7.85D-09
 1.77D-09 5.20D-11 5.39D-11 5.79D-11 7.07D-11 9.49D-11 1.51D-10 3.64D-10
 8.00D-10 1.77D-09 4.52D-09 7.95D-09
 4.92D-09 3.68D-10 3.72D-10 3.80D-10 4.05D-10 4.46D-10 5.30D-10 7.99D-10
 1.28D-09 2.26D-09 4.92D-09 8.24D-09
 8.70D-09 1.13D-09 1.13D-09 1.14D-09 1.17D-09 1.21D-09 1.31D-09 1.60D-09
 2.09D-09 3.05D-09 5.55D-09 8.70D-09
C-------------------------------------------------------------------------------
C   THERMAL CHARGE EXCHANGE RATE COEFFICIENT SOURCE LIST
C
C   ISEL  DONOR      RECEIVER   FINAL STATE  SOURCE
C   ----  ---------  ---------  -----------  ----------------------------------
C     1   H + 0 (1)  C + 2 (1)  2p (2P)      /u/cfm/adas/adf24/scx#h0/scx#h0_cfm#c2.dat
C     2   H + 0 (1)  C + 2 (1)  2p2(2D)      /u/cfm/adas/adf24/scx#h0/scx#h0_cfm#c2.dat
C     3   H + 0 (1)  C + 2 (1)  Total        /u/cfm/adas/adf24/scx#h0/scx#h0_cfm#c2.dat
C
C
C
C   Processing code: ADAS509
C   Producer:        C.F. Maggi
C   Date:            27/11/97
C
C-------------------------------------------------------------------------------
```