CHARGE TRANSFER IN HIGH VELOCITY C_N^+ - HE COLLISIONS

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We present results concerning charge transfer cross sections and dissociation branching ratios in fast collisions (v=2.6 a.u) between C_n^+ clusters (n=1-10) and helium atoms. Experiments were performed at the Tandem facility in Orsay (France) and were realized in inverse kinematics with clusters as projectiles. Thanks to a recent method of shape analysis of current signals from silicon detectors [1], all branching ratios for fragmentation of neutral clusters C_n were extracted (see figure 1).

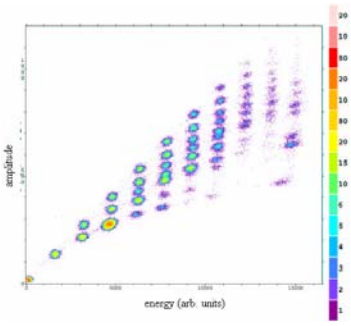

Figure 1: Two-dimensional representation (amplitude vs integral) of current signals for neutral clusters created in C_{10}^+ + He collisions at 20 Mev. Each spot corresponds to a different fragmentation pattern

These results, partly published (n=5,7,9) [2] will be presented for all n values at the conference. For instance, figures 2a-2d show the evolution with the cluster size of the branching ratios associated to a given number of emitted fragments. From these branching ratios, and using the statistical Metropolis Monte-Carlo (MMMC) fragmentation theory adapted to these systems [2-3], we could deduce the energy deposited in the cluster by charge transfer. Associated to charge transfer cross sections, this provides a set of data which should help to understand this mechanism and hopefully stimulate collision simulation in these complicated systems.

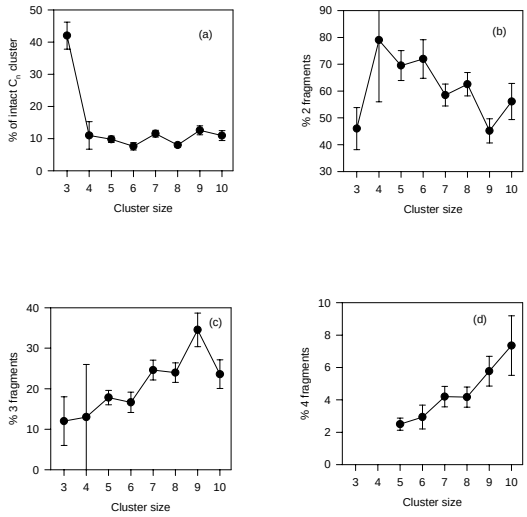

Figure 2: Dependence with the cluster size of the measured percentages of intact clusters (a), fragmented clusters in two fragments (b), three fragments (c) and four fragments (d)

References

[1] M.Chabot et al NIMB **197** 155 (2002)
[2] G.Martinet et al PRL **97** 063401 (2004)
[3] S.Diaz-Tendero et al, to appear in PRA (2005)