INTERSTELLAR CHEMICAL MODELS WITH MOLECULAR ANIONS

ERIC HERBST, *Departments of Physics, Astronomy & Chemistry, The Ohio State University, Columbus, OH 43210*; TOM MILLAR, MARTIN CORDINER, CATHERINE WALSH, *Queen's University Belfast, Belfast, Northern Ireland, UK*; ROISIN NI CHUIMIN, *Astrophysics Group, The University of Manchester, Manchester M60 1QD, UK*.

Now that the first molecular anion, C_6H^-, has been detected in the cold dark cloud TMC-1 and both this ion and C_4H^- detected in the circumstellar envelope IRC+10216 based on the laboratory work of Thaddeus and co-workers[a b], it is of interest to study anew how anions are produced and destroyed via gas-phase reactions in interstellar and circumstellar environments. Relatively abundant anions are most likely formed principally by radiative attachment and depleted by photodetachment and ion-molecule reactions with atomic hydrogen and oxygen[c]. New estimates of rate coefficients for some of these processes have been made. We have then included formation and depletion pathways for a number of molecular anions in the latest UMIST database for astronomy (http://www.udfa.net/). With this enhanced network, theoretical abundances and column densities of the anions in TMC-1 and IRC+10216 have been calculated. Our results will be discussed, along with our views on the most likely new anions to be detected once laboratory data become available.

[a] M. C. McCarthy et al. *ApJ* **652**, L141, 2006.
[b] H. Gupta et al. *ApJ* **655**, L57, 2007.
[c] E. Herbst, *Nature* **289**, 656, 1981.