

Comet Coma Composition

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Comets provide direct informations on the composition of the outer regions of the solar nebula, where they formed 4.6 Gyr ago. The knowledge of their chemical composition is therefore of strong interest for constraining the early Solar System formation. In addition, it informs us on the ingredients that comets could have brought to Earth for the emergence of life. Much progress has been made recently on this topic thanks to the apparition of two exceptional comets: comet C/1996 B2 (Hyakutake), which approached the Earth at only 0.1 AU in March 1996, and comet C/1995 O1 (Hale-Bopp), which exhibited an extraordinary activity near perihelion in March–April 1997. 15 new molecular species have been identified in their coma, by remote sensing observations in the radio and infrared domains: NH_3 , HNC , HNCO , HC_3N , CH_3CN , NH_2CHO , HCOOH , HCOOCH_3 , SO_2 , OCS , SO , H_2CS , CH_4 , C_2H_2 and C_2H_6 . Many of them have not been observed in other Solar System objects, while they are observed in interstellar molecular clouds. In addition, isotopic varieties of H_2O (HDO) and HCN (DCN , H^{13}CN , H^{15}N) and ^{34}CS have been detected. We will review molecular abundances in cometary atmospheres and discuss their similarities with interstellar ices and gases in star-forming regions.