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Thermal electron attachment to O_2, NO, N_2O, and Nucleobases EDWARD C. CHEN, EDWARD CHEN, Baylor College of Medicine, CHEN COLLABORATION — New electron affinities and activation energies for thermal electron attachment for O_2, NO, N_2O and the nucleic acids are presented. These are (in eV): O_2, 1.07(1)/1.05(1); NO, 0.91(1); Guanine(G),1.645(5); Adenine(A), 1.095(5); Cytosine(C);1.041(5);Uracil,(U) 1.000(5); and Thymine(T) 0.990(5) in agreement with literature values. The electron affinities for the nuclobases support that for Watson Crick AT, 1.40(10) eV and proposed mechanisms for electron conduction and radiation damage and repair and in DNA. Gas phase electron affinities from reduction potentials and voltage onsets for ESR spectra are: (in eV) [2,2] paracyclophane, -0.35(5); 3,3',5,5'-tetra-tbutylbiphenyl, -0.05(5); 4,4' di-tbutylbiphenyl, -0.02(5) 4,4-dimethylbiphenyl,-0.01(5); 2,3-dimethylnaphthalene,0.09(5); acenaphthaene,0.10(5) pyrimidine, 0.35(5); pyradazine, 0.49(5) pyrazine, 0.55(5); s-triazine, 0.64(5); as-triazine, 1.08(5); purine, 1.20(5); s-tetrazine, 1.84(5). Multiple excited state electron affinities including one for N_2O, 0.4(1) eV and activation energies are reported. These are examples of fundamental data that can be obtained from ion molecule reactions in plasmas.

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