Geophysical Research Abstracts, Vol. 9, 09215, 2007 SRef-ID: 1607-7962/gra/EGU2007-A-09215 © European Geosciences Union 2007



Towards Understanding Ozone Isotope Effects in Electric Discharges – Wall and Gas Phase Formation of Ozone

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The unusual oxygen isotope effect in the gas phase formation of the ozone molecule which is the prime example of so called mass independent isotope fractionation effects is not yet understood completely. Nevertheless, molecular symmetry is thought to be a crucial factor. Recently, an isotope effect based on symmetry considerations has also been suggested in $O + XO \rightarrow XO_2$ reactions (XO_2 mostly being a refractory oxide with X = Ca, Al, C...) that occur on the surface of a solid [Marcus, *J. Chem. Phys.* 121, 2004]. Since there is no direct evidence for unusual isotope effects in these chemical systems and since there is no such evidence for unusual isotope effects on the corresponding surface reactions in particular, we attempt an analysis of new and existing isotope data for the $O + O_2$ system. From that analysis we conclude that the ozone formation reaction does not provide evidence for an unusual isotope effect in surface assisted O + XO reactions even though the gas phase reaction shows the largest isotope anomaly known so far.