

Mass independent isotope fractionation of molecular oxygen during electron ionization

Osamu Abe[1]; Minoru Ozima[2]; Akinori Yamada[3]

[1] GSES, Nagoya Univ.; [2] NONE; [3] Earth and Planetary Sci., Univ. of Tokyo

Isotope fractionations can be described simply as a function of mass differences between isotopes or isotopic molecules for any chemical reactions in equilibrium systems and/or most of kinetic processes such as evaporation, condensation and surface adsorption, which are so-called 'mass dependent isotope fractionation (MDF).' [1] On the other hand, processes those do not depend on mass differences (mass independent isotope fractionation, MIF) have been found recently in extraterrestrial materials and stratospheric photochemical reactions.

Moreover, apparent MIF processes have been found in the analysis for triple oxygen isotopes using gas-source isotope ratio mass spectrometer. [2][3]

Here, we discuss the reason of these apparent MIF of oxygen molecule during ionization by electron impact and its implication for planetary sciences.

[1]Dodson MH (1963) J. Sci. Instr., 40, 289-295.

[2]Abe O, Yoshida N (2003) Rapid Commun. Mass Spectrom., 17, 395-400.

[3]Barkan E, Luz B (2003) ibid, 2809-2814.