論文 / 著書情報
Article / Book Information

題目(和文)	SO2光化学反応における硫黄同位体非質量依存分別の実験的研究とその太古代大気への適用
Title(English)	Experimental study on sulfur mass-independent fractionation during SO2 photochemistry and its application to Archean atmosphere
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種別(和文)	要約
Type(English)	Outline

Title: Experimental study on sulfur mass-independent fractionation during SO_2 photochemistry and its application to Archean atmosphere

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Summary:

Sulfur mass-independent fractionation (S-MIF) is expected to provide useful insights into chemistry and physics of Earth's early atmosphere. Photolysis of SO_2 is known to cause large S-MIF. However, the mechanisms of S-MIF have not been fully understood. I have conducted a series of experiments to examine S-MIF during SO_2 photochemistry particularly under reducing atmosphere. The results demonstrated that geological S-MIF trend ($\Delta^{36}S/\Delta^{33}S = -1$) can be reproduced when atmosphere contains CO. Also, the photochemical S-MIF is derived from two mechanisms: self-shielding in SO_2 photolysis and intersystem crossing in excited SO_2. Furthermore, the magnitude of S-MIF was dependent significantly on total pressure and pSO_2. Consequently, in order to reproduce the large S-MIF observed in late Archean sedimentary rocks, the atmosphere should be reducing and low total pressure well below 1 bar.