

# 第 273 回 化学コロキウム

題目：

**“ Uranium isotope fractionation as a proxy for bioreduction ”**

講師：

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日時： 平成 2 8 年 1 月 3 1 日 (火)

1 5 時 0 0 分 ~ 1 7 時 0 0 分 (講演は約 1 時間)

場所： 1 1 号館 1 0 6 号室

連絡先：分子物質化学専攻 理論・計算化学研究室  
阿部 穰里 (5 7 1 号室、内線 3 5 8 2)

# **“ Uranium isotope fractionation as a proxy for bioreduction ”**

Abstract:

Uranium is a redox active element that can undergo reduction from the hexavalent form (U(VI)), that is predominant in oxic systems, to the tetravalent form (U(IV)), that is prevalent under anoxic conditions. The process of reduction can be catalyzed by a variety of reducing agents including microorganisms, ferrous iron-bearing reductants, sulfide-bearing reductants, as well as reduced organic matter. Here, we show that depending on the reducing agent, whether biotic or abiotic, the isotope fractionation behavior of uranium exhibits a distinct signature. In essence, it appears that it is possible to distinguish biotic from abiotic mechanisms of uranium reduction based on the isotope composition of this element. The ability to deconvolute biotic from abiotic processes would provide a means to identify environmental niches in which microbial activity was prevalent at a specific time in paleohistory and to correlate specific biogeochemical events with the corresponding microbial metabolism. However, there remains a large question looming before this tool can be considered robust for all relevant environmental and paleoredox systems: what are the mechanistic underpinnings of the distinct isotope fractionation between biotic and abiotic systems?