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・ 博士後期課程量子線科学専攻 (Major in Quantum Beam Science)

● 研究テーマ (Research theme)

- ① 超重元素イオンビームを用いた原子科学
(Studies on Atomic and Chemical Properties of Superheavy elements using their ion-beams)
- ② 超重元素の化学的性質の解明
(Studies on Chemical Properties of Chemical Species of Superheavy Elements)

① 原子番号が100を超える周期表の重い極限領域に位置する超重元素では、化学的性質が周期表に従わなくなる可能性が指摘されています。加速器を用いて超重元素を合成し、そのイオンビーム生成やイオンビームとの相互作用を観察することで、超重元素原子のもつ性質を明らかにします。

It has been pointed out that superheavy elements in the heavy extreme region of the periodic table with atomic numbers above 100 might have chemical properties that are different from that expected from the periodic table. To elucidate the chemical and atomic properties of superheavy element atoms, we have studied their ion beam generation and interaction with the ion beams using synthesized superheavy elements using a heavy ion accelerator.

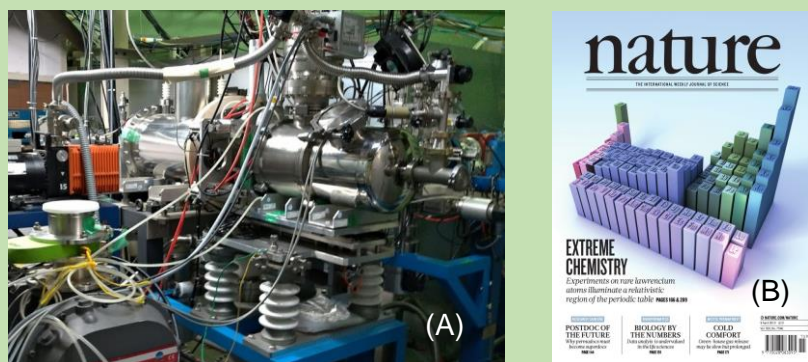


Fig. (A) Isotope Separator On-Line (JAEA-ISOL), (B) Cover picture featured in *Nature* for the first successful measurement of the first ionization potential of Element 103, lawrencium.

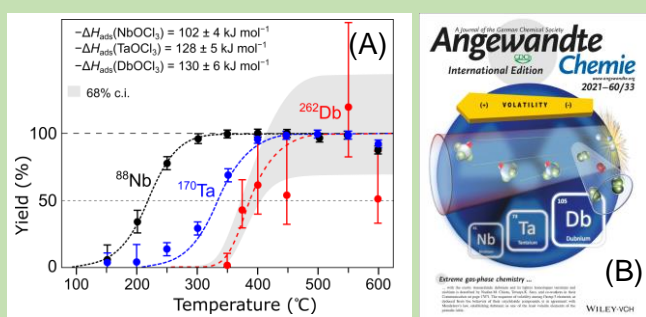


Fig.(A) Isothermal gas chromatographic behavior of oxychlorides of group-5 elements, Nb, Ta, and Db. The results show that Db compound would have similar volatility to Ta, which is different from that expected periodic table. (B) Cover picture featured in *Angewandte Chemie Int. Ed.* (IF=16.823).

② 一度に原子一個しか扱うことのできない超重元素に適用可能な、迅速・高効率な実験手法を開発し、気相化学および液相化学的アプローチによって、数秒～数分とごく短い寿命しか持たない超重元素の化学的性質を調べています。

We have developed rapid and highly efficient experimental methods applicable to superheavy elements that can handle only one atom at a time. By using the methods and apparatus, we have been investigating the chemical properties of chemical species of superheavy elements.

キーワード (Keyword)

専門分野 (Specialized Field)

共同研究可能技術 (Possible Technology of Cooperative research)

関連論文・特許情報 website

(Related articles・patent information)

研究設備 (Research Facility)

研究室URL (Lab. URL)

E-mail

超重元素 (Superheavy elements)、イオンビーム (ion-beams)、核反応 (Nuclear reaction)

放射化学 (Radiochemistry)、核化学 (Nuclear chemistry)

オンライン同位体分離器 (ISOL)

<https://asrc.jaea.go.jp/soshiki/gr/HENS-gr/index.html>

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