

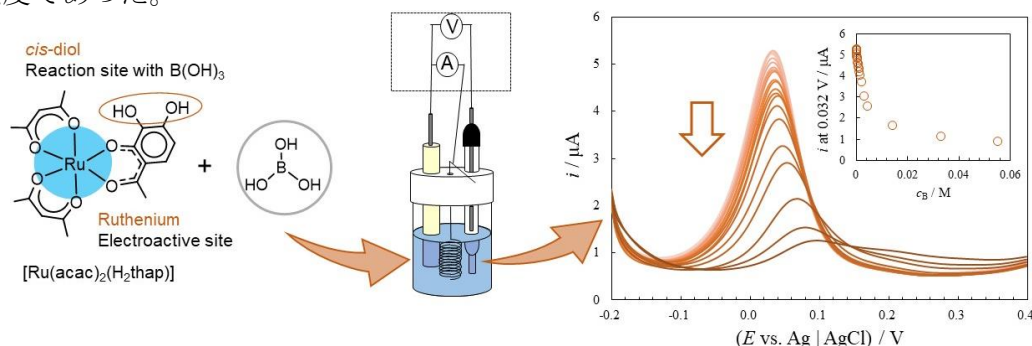
## ( $\beta$ -ジケトナト) ルテニウム錯体を用いた電気化学的ホウ酸検出

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 Electrochemical Detection of Boric Acid Using ( $\beta$ -diketonato)Ruthenium Complex  
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The development of a simple and highly sensitive boric acid detection method is desired in many fields. However, currently used boric acid detection methods require complicated processes and expensive equipment<sup>1)</sup>. We aimed to develop an electrochemical boric acid detection method that solves these problems. Tris( $\beta$ -diketonato)ruthenium complex shows reversible one-electron reactions in both redox waves, and a variety of structures can be constructed using various ligands. In this study, we synthesized a new ruthenium complex [Ru(acac)<sub>2</sub>(H<sub>2</sub>thap)] with a diol moiety that can bind to boric acid. DPV measurement of [Ru(acac)<sub>2</sub>(H<sub>2</sub>thap)] aqueous solution while adding boric acid showed a decrease in peak current at 0.032 V with increasing boric acid concentration. On the basis of the relationship between the current values and boric acid concentrations, the LOD of this method was calculated to be 5.1 mg B L<sup>-1</sup>, which was more sensitive than the electrochemical boric acid detection method with H<sub>3</sub>thap (LOD; 15.3 mg B L<sup>-1</sup>).

**Keywords :** Ruthenium complex; Boric acid; Voltammetry; Absorptiometry titration

多分野において簡易的かつ高感度なホウ酸検出法の開発が望まれている。しかし、現在利用されているホウ酸検出法は、煩雑な工程や高額な設備を要する<sup>1)</sup>。我々は、こうした課題を解決する電気化学的ホウ酸検出法の開発を目指した。トリス ( $\beta$ -ジケトナト) ルテニウム錯体は酸化還元とともに可逆な電気化学的応答を示し、様々な配位子を用いて多様な構造を構築できる。本研究では、ホウ酸と結合可能なジオール部位を持つルテニウム錯体[Ru(acac)<sub>2</sub>(H<sub>2</sub>thap)]を新規合成し、本錯体を用いたホウ酸検出を試みた。[Ru(acac)<sub>2</sub>(H<sub>2</sub>thap)]水溶液に対してホウ酸を添加しながら DPV 測定を行ったところ、ホウ酸濃度の上昇に伴った、0.032 V のピーク電流値の減少が観察された。電流値変化とホウ酸濃度の関係から、本方法の LOD は 5.1 mg B L<sup>-1</sup> と算出でき、配位子 H<sub>3</sub>thap を用いた電気化学的ホウ酸検出法 (LOD; 15.3 mg B L<sup>-1</sup>) と比較して、高感度であった。



1) K. Sato, H. Kimoto, T. Hashimoto, T. Hayashita, *J. Ion Exch.*, **2022**, 33(4), 100-104.