

Electrochemiluminescence emission of methamphetamine for accurate detection

November 29 2021

Researchers at Shinshu University's Department of Chemistry attempted to establish technology that enables simple, highly sensitive, and selective screening and analysis of stimulants, namely components of regulated toxicants. The number of arrests for the possession or use of methamphetamine and other illegal substances in Japan has exceeded 10,000 per year, which has become a serious social problem. Therefore, there is high demand in the fields of forensic science and clinical chemistry for simple test methods that can be applied to field analysis for a large number of samples.

Currently, simple test kits for [illegal drugs](#) that are abused, including stimulants are on the market, but some drug components may show false positives for methamphetamine due to the detection principle. Therefore, in this study published in *Analytica Chimica Acta*, the research group led by Associate Professor Fumiki Takahashi embarked on a study to develop a simple and accurate screening for stimulants based on a novel detection principle.

The [measurement method](#) is to insert an electrode into an [aqueous solution](#) containing a luminescent reagent and the current response and weak luminescence (electrochemiluminescence) response is observed when a potential is applied. It was known that if the aqueous solution contained a stimulant, it could be detected because it emits light. However, it was difficult to selectively detect stimulants because similar behavior was observed for some of the commercially available pharmaceutical drugs. In this study, the group reported that it is possible

to distinguish and semi-determine stimulants and commercially available pharmaceutical drugs by producing the potential applied to the electrodes a characteristic waveform in which the DC potential and the AC potential are superimposed. Accurate potential control and its analysis method were devised in the course of the experiment.

Now that the principle of the potential modulation-electrochemical detection system has been constructed, the group will continue to aim for its application as a stimulant screening device. By making a practical disposable analysis chip, the group hopes to establish a method that can be used in the field for simple and safe [stimulant](#) screening. Associate Professor Takahashi hopes that this research will contribute to the Sustainable Development Goals SDGs No. 3 (health and welfare for all) and No. 16 (peace and justice for all).

More information: Fumiki Takahashi et al, Sensitive screening of methamphetamine stimulant using potential-modulated electrochemiluminescence, *Analytica Chimica Acta* (2021). [DOI: 10.1016/j.aca.2021.339229](#)

Provided by Shinshu University

Citation: Electrochemiluminescence emission of methamphetamine for accurate detection (2021, November 29) retrieved 25 April 2024 from <https://phys.org/news/2021-11-electrochemiluminescence-emission-methamphetamine-accurate.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.