evropský sociální fond v ČR
EVROPSKÁ UNIE
MINISTERSTVO ŠKOLSTVÍ, MLÁDEŽE A TĚLOVÝCHOVY
OP Vzdělávání pro konkurenceschopnost
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Automatic electrochemical detection of heavy metals

Název:

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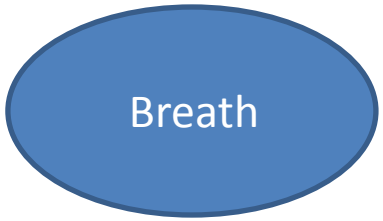
Název projektu: Mezinárodní spolupráce v oblasti ´´in vivo´´ zobrazovacích technik

HEAVY METALS

- In recent years, there has been an increasing ecological and global public health concern associated with environmental contamination by heavy metals.

- Most environmental contamination and human exposure result from anthropogenic activities such as mining and smelting operations, industrial production and use, and domestic and agricultural use of metals and metal-containing compounds.



How can heavy metals enter to human body?

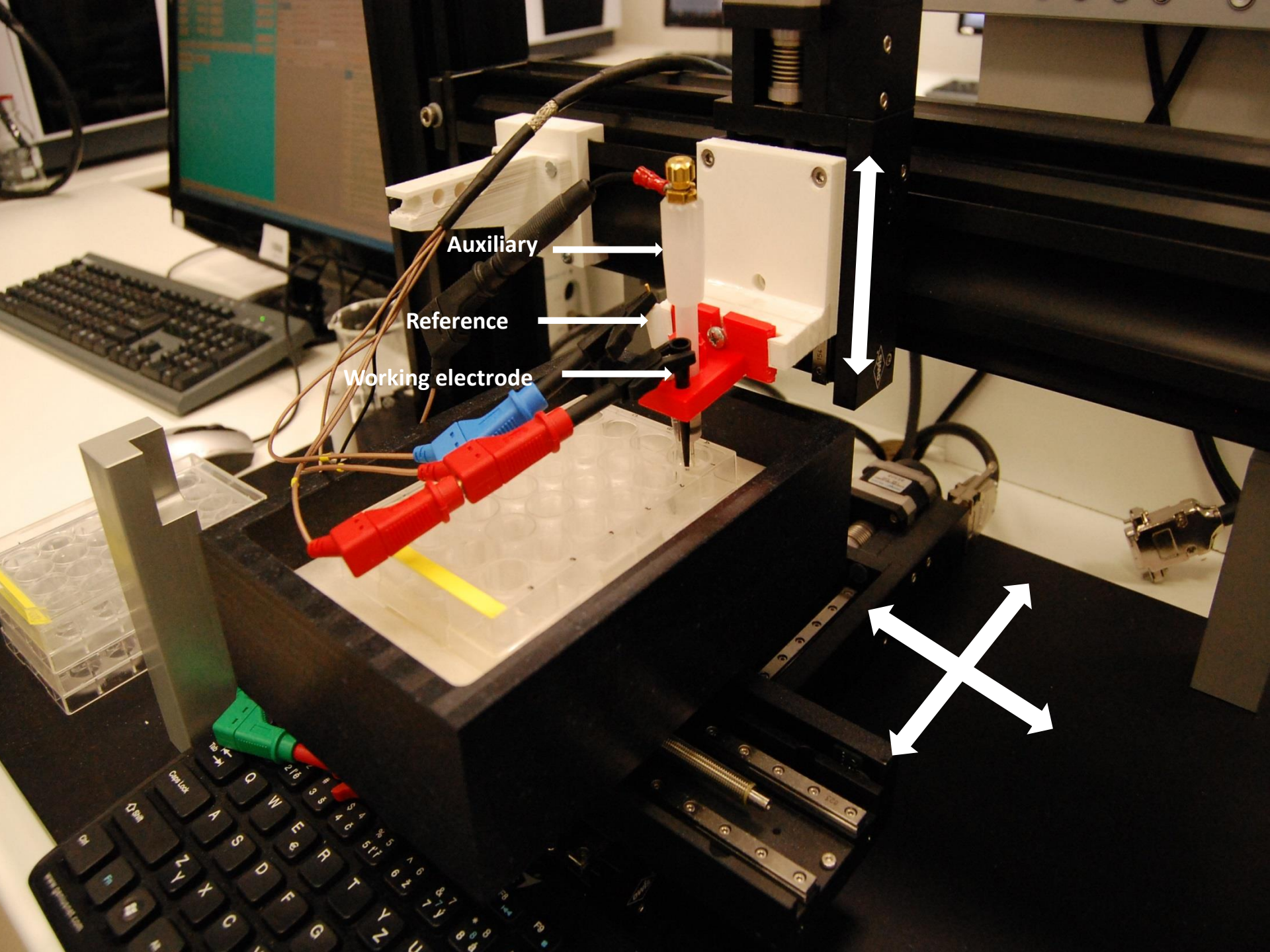
Automatic electrochemical detection of heavy metals such as Zn, Cd, Pb, and Cu ion by carbon tip electrode.

MATERIALS AND METHODS

The commercial carbon tip modified with mercury film was employed as working electrode in this study by applying a conditioning time of 60 s at –0.9 V into $Hg(NO_3)_2$ solution. Ag/AgCl/3M KCl was reference electrode and counter electrode was platinum electrode.

Differential pulse voltammetry (DPV) method was used. Buffer is acetate pH 5.


PC
Automatic moving system
3 electrodes


Auxiliary
Reference
Working electrode

RESULT AND DISCUSSION

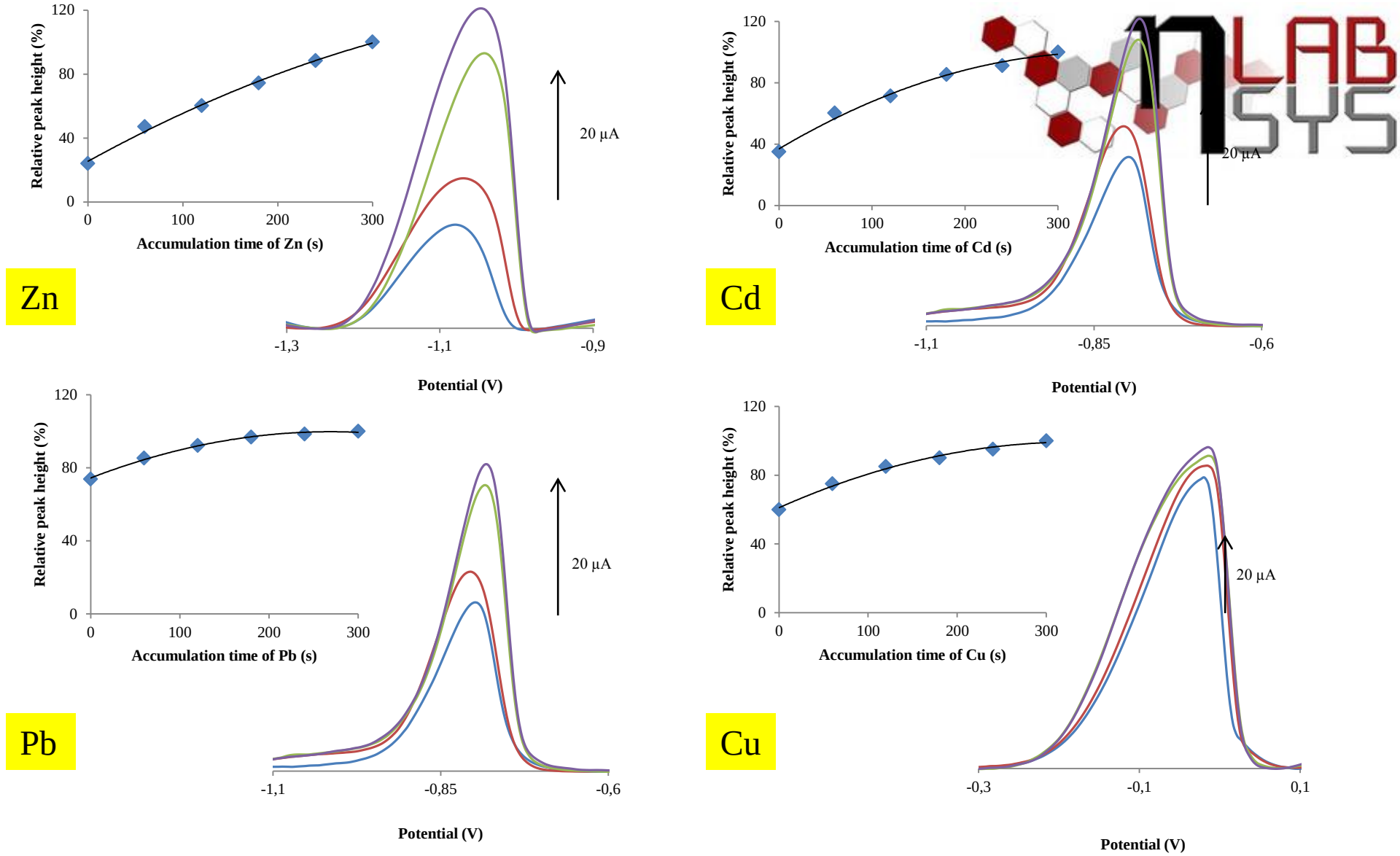


Fig. 1 Effect of accumulation time (s) on relative peak height of Zn, Cd, Pb, and Cu ion (%). The parameters of DPV were as it follows: concentration of Zn, Cd, Pb, and Cu is 20 µg/ml, initial potential -1.6 V, end potential 0.2 V, step potential 0.005, modulation amplitude 0.1 V, modulation time 0.004 s, interval time 0.1 s.

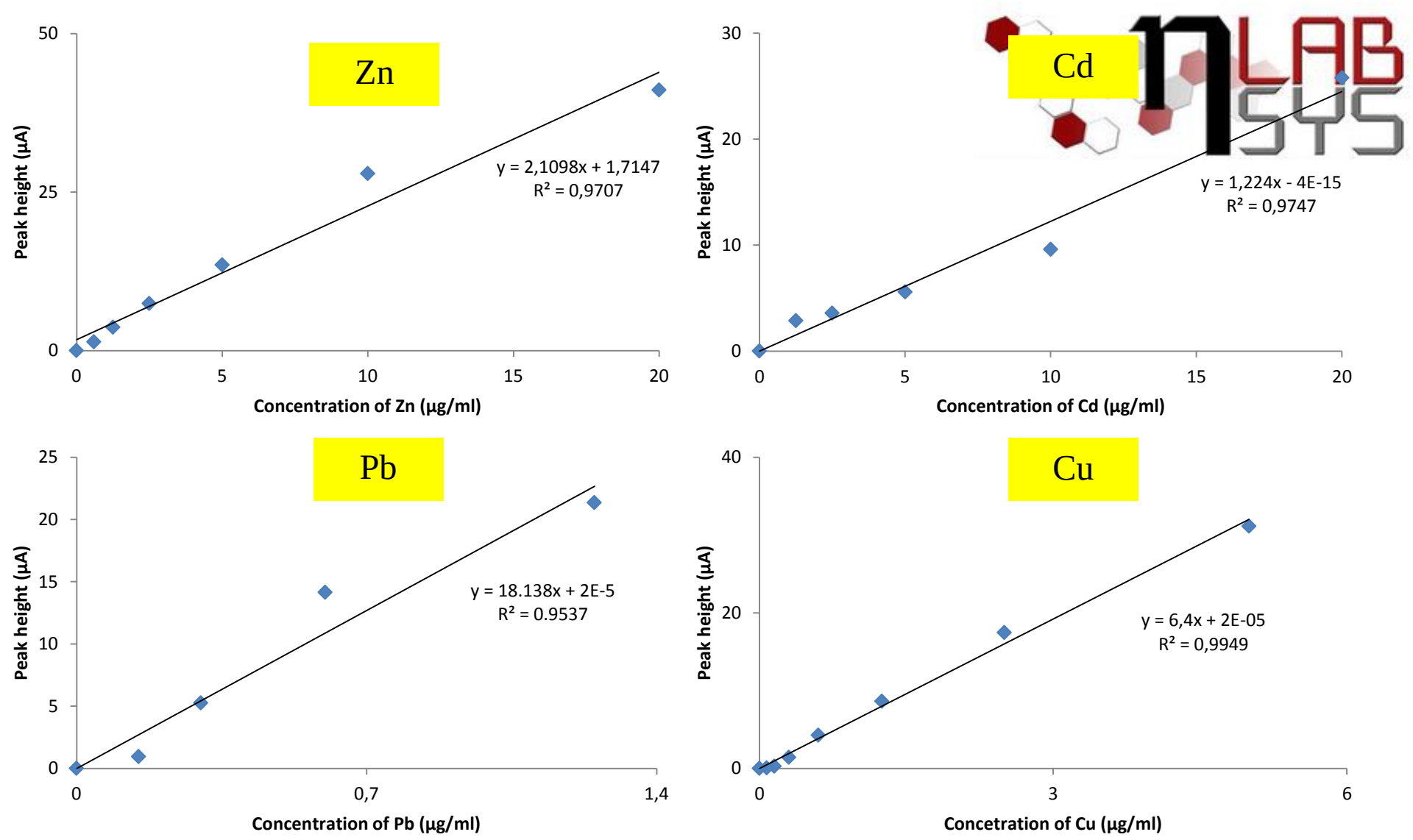


Fig. 2 Calibration curve of Zn, Cd, Pb, and Cu ion. The parameters of DPV were as it follows: accumulation time of 120 s, initial potential -1.6 V, end potential 0.2 V, step potential 0.005, modulation amplitude 0.1 V, modulation time 0.004 s, interval time 0.1 s.

Conclusions

Commercial carbon tip electrode modified with Hg film can be used for detection of heavy metal such as Zn, Cd, Pb or Cu.

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"*in vivo*" zobrazovacích technik
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Laboratoř Metalomiky a Nanotechnologií
Laboratory of Metallomics and Nanotechnologies

Thank you for your attention

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