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Practical recommendations to development motivation to study chemistry

Summary. In this article the possibility to raise cognitive activity of pupils at chemistry lessons by means of didactic games, as games process stimulates thinking activity, a child feels and creates freely. A didactic game will allow to brightly implement all the principal teaching functions and also to use a complex of informative tasks of interdisciplinary character (the integrated tasks), a set of cards on self-testing of individual achievements and independent increase in level of knowledge and abilities.

Keywords: perspective, teaching chemistry, didactic games, cognitive activity, motivation

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**Pb (II) SPECIFICATION ON CARBON PASTE ELECTRODE MODIFIED BY
ELECTROCHEMICAL DEPOSITION OF SILVER NANOPARTICLES IN WATER**

Abstract. In this work a simple and economical electrode has been developed to detect Pb (II) in water by anodic stripping voltammetry. To achieve a better sensing performance of lead (II) CPE modified with silver nanoparticles by electrodeposition. The carbon paste electrode (CPE) modified with silver nanoparticles (AgNPs) demonstrates high sensitivity in the detection of lead (II) by using anodic stripping square wave voltammetry. For AgNPs modified CPE detection limit of lead was $8,03 \times 10^{-8}$ mol/L.

Keywords: silver nanoparticles, Pb^{2+} detection, carbon paste electrode, electrodeposition

Introduction

Refinement of water from toxic metals is worldwide concern. Toxic heavy metals are hazardous pollutants by their high solubility in the aquatic environments. They can be absorbed by living organisms. When they enter the food, large concentrations of heavy metals may accumulate in the human body. If the metals are ingested beyond the permitted concentration, they can cause serious health disorders. Therefore, detection of toxic heavymetals from aqueous solution is primaryimportance.

Poisoning with lead in human cause's serious harm to the kidney, liver also nervous and reproductive systems. It also can affect to nephro toxic effects of high exposure level and bone injury for long-term exposure [1,2]. According to Ref. [3], for certain reasons children are more sensitive to the influence of lead than adults. Among to their major consequences are diminished intelligence quotient, effects on the nervous system, impairing of sensory systems, involuntary nervous and kidney functions, and premature births.

The main lead pollution is by automobiles and battery industries[4]. Also, ions of lead generally occur in industrial and agricultural wastewater and acidic leachate from landfill sites in relatively high concentration[1].

Up to know, many of methods have been applied to determine Pb ions. Researchers [5] were developed colorimetric detection technique for Pb^{2+} ions. In living organisms Pb^{2+} ions were detected with sensitive near-infrared fluorescent probe methods. [6] Also, a method was investigated for analysis of Pb ions in aqueous and biologic systems by combining online flow injection and preconcentration with inductively coupled plasma-MS [7]. But these methods need costly apparatus. The most reliable techniques used for the determination of Pb ion is the electrochemical methods, where they have many advantages such as high sensitivity and selectivity with high speed, less cost, relative simplicity and low detection limit. Although, nowadays voltammetric methods have been extensively used.

Voltammetric methods have been conducted with different electrodes. Carbon paste electrodes (CPEs) are perspective electrochemical sensors of wide workability. **The authors of more recent studies[8–12]have established that** carbon paste electrodes were sensitive and reliable. Carbon paste electrodes have many possibilities like easily renewable surface, low cost, and have very low background currents[12]. The advantages of applying carbon wax electrodes for electrochemical measurements mostly in voltammetric and polarographic researches, such as improved reproducibility, low residual currents and robust in operation, have been earlier reported[13,14]. The carbon-wax sensor features (sensitivity, pH optimum, electrochemical behavior, storage and operational stability) have been evaluated and compared with a traditionally utilized

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Судағы Pb (II)-ын квадрат толқындық вольтамперметрия әдісімен анодтық еріту арқылы күмістің нанобөлшектерімен модифицирленген көміртек пасталық электродта анықтау

Түйіндеме. Қорғасынды (II) анықтау аналитикалық химияда маңызды мәселелердің бірі болып табылады. Қорғасын металымен улану адам өмірі үшін қауіп тудырады. Бұл мақалада Pb (II) анықтау әдісі келтірілген. Көміртек пасталы электродты модифицирлеуде үшін электротұндырылған күмістің нанобөлшектері пайдаланылды. Модифицирленген электрод ағын суының құрамындағы Pb (II) анықтау кезінде жоғары сезімталдықты көрсетті.

Кілт сөздер: күміс нанобөлшектері, Pb²⁺ анықтау, көміртек пасталы электрод, электротұндыру

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Определение Pb (II) на угольно – пастовом электроде, модифицированном электрохимическим осаждением серебряными наночастицами

Резюме. Определение свинца (II) является важной проблемой в аналитической химии. Потому что отравление свинцом вызывает серьезную болезнь для жизни человека. Эта статья демонстрирует метод обнаружения Pb (II) в воде. Для модификации СРЕ использовались AgNPs. Модифицированный электрод показал высокую чувствительность при определении содержания свинца (II) в водопроводной воде.

Ключевые слова: наночастицы серебра, Pb²⁺ определение, угольно – пастовый электрод, электроосаждение

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RESEARCH ON THE RECOVERY OF USEFUL COMPONENTS FROM ASH AND SLAG WASTES

Abstract: At present, when the reserves of ore minerals exhaust, the man-made materials are required to be processed, say the ash combustion of the Ekibastuz coal. Every year, from 25 to 38 million tons is generated as a result of coal combustion and the ash accumulation consistent with the natural processes. Processing of these man-made materials and acquisition of valuable components out of them contributes to eliminate the high technogenic pressure of mining processing facilities of industrial districts on the ecologically vulnerable natural systems and local population. By the way, the technogenic technology is being developed in a modern technology.

Key words: ash and slag, wastes, technogenic raw material, ash dump, gravity concentration, free gold, sphermagnetite.

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ИССЛЕДОВАНИЕ ПО ИЗВЛЕЧЕНИЮ ПОЛЕЗНЫХ КОМПОНЕНТОВ ИЗ ЗОЛОШЛАКОВЫХ ОТХОДОВ

Аннотация: В настоящее время, с истощением запасов рудного минерального сырья, появляется необходимость переработки техногенного сырья, например, золы сжигания Экибастузских углей. Каждый год при сжигании углей образуется от 25 до 38 млн. т золы и по своим масштабам накопление золы сопоставимо с природными процессами. Переработка данного вида техногенного сырья наряду с получением из них полезных компонентов, дает возможность