MR-A10

THE DETERMINATION OF HEAVY METAL LEVELS IN THE ORGANS OF WHITE LEGHORN CHICKENS (SPF) BY ATOMIC ABSORPTION SPECTROPHOTOMETER

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In this work, we used five different aged groups of chickens that are grown in Poultry Diseases Research & Vaccine Production Institute for vaccine production and are not affected by environmental conditions, SPF (Specific Pathogen Free). Hg, Cd, Cu, Pb and Zn levels of each chicken in their livers, kidneys and spleens were determined by the Atomic Absorption Spectrophotometer.

MR-A11

THIN LAYER ELECTROCHEMICAL RAMAN MEASUREMENT FOR COMPLEX ELECTRODE REACTIONS

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For the Raman observation on the vicinity of the electrode, we have developed a thin layer electrochemical resonance Raman (TLERR) method to analyse the complex electrode reactions [1]. The Raman measurement using a thin layer spectrerochemical cell has an advantage that the species only in the vicinity of the solution/electrode interface can be targeted, so that electrochemical or chemical reactions on the electrode surface can be directly observed. In the reduction of 2,3,5,6-tetrachloro-1,4-benzoquinone (TCQ), complex voltamograms were observed in the presence of alkali earth metal ions due to the ion pair formation. By using the TLERR measurement after the reduction of TCQ in the presence of Mg²⁺, it was clarified that the intermediate ion pair, Mg²⁺·TCQ⁻, was reduced to the dianion pair, Mg²⁺·TCQ²⁻. By contrast, in the case of Ba²⁺, the anionic radical salt (Ba²⁺·TCQ⁻) was found to deposit on the electrode surface, which was confirmed the Raman measurement of the salts of reduced species produced by a flow-electrolysis synthesis. Depending on the sort of the metal cations, the electrochemical behavior was quite different, i.e. the intermediate ion pair, Mg²⁺·TCQ⁻, receive another electron or deposit on the electrode surface.


MR-A12

USE OF IN-SITU SURFACE SPECTROSCOPIC AND MICROSCOPIC TECHNIQUES TO ASCERTAIN THE FATE AND MECHANISMS OF METAL CONTAMINANTS IN THE SUBSURFACE ENVIRONMENT

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Definitively ascertaining the sorption mechanisms of metals on clay and metal oxide surfaces is important in understanding the fate of metals in contaminated soils and sediments. X-ray absorption fine structure (XAFS) spectroscopy and scanning force microscopy (SFM) are two in-situ techniques that were used to study metal reaction mechanisms at the mineral/water interface. These studies have shown that polynuclear surface complexes occur on an array of mineral surfaces that are common in the environment. The surface precipitates often form on rapid time scales, at metal surface loadings far below a theoretical monolayer coverage, and in a pH range well below that at which metal hydroxide precipitates would be expected to form according to the thermodynamic solubility product. XAFS studies indicate that the polynuclear complexes are mixed metal/Al hydroxide phases and form when a metal such as Ni(II), Co(II), Zn(II), or Mn(II) is introduced into an environment in which there is a source of hydrolyzed species of Al(III), Fe(III), and Cr(III). Scanning probe microscopy (SPM) studies show that the mixed metal/Al hydroxide phases extensively cover mineral surfaces and are much more resistant to dissolution than the pure divalent metal hydroxide compounds [1]. The formation of mixed-cation hydroxide compounds should be considered when conducting metal sorption experiments, modeling metal surface complexation, determining speciation, and assessing the risk of the migration of contaminants in polluted sites.