HEAD SPACE VOLTAMMETRIC DETERMINATION OF FORMALDEHYDE

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Formaldehyde (FA) is a raw material in manufacturing processes of various resins which are broadly applied in construction and furnishings. Long exposure to indoor air containing FA causes a negative impact on the central nervous, blood, and immune systems. Therefore, monitoring of formaldehyde are an important task for environmental analysis.

Several methods and techniques have been reported for determination of the formaldehyde in water. Therefore, chromatographic methods have been developed such as high performance liquid chromatography (HPLC), gas chromatography (GC). Formaldehyde can be oxidized at suitable electrodes. Preconcentration steps are important in terms of selectivity to be maintained. Initial studies carried out with HS voltammetry have revealed very promising results and therefore, it was planned to study formaldehyde analysis in addition to the phenolic compounds by HS voltammetry.

Head Space (HS) techniques provide a practical tool for determination of volatile organic compounds by simply eliminating any interference from non-volatile components of the sample. A recent study in this lab has revealed that an electrode modified with conducting polymer can be used as a head space preconcentration tool for volatile compounds and a transducer as well which allows monitoring the responses. The glassy carbon electrode (GCE) surface was modified with polypyrrole by electropolymerization and then, the modified electrode was placed over the solution in a sealed vial heated gently on a hotplate with a stirrer for phenol determination. The electrode assembly was exposed to the HS in equilibrium with wastewater samples for controlled times, until a convenient preconcentration of volatile phenols was achieved.

The usages of carbon based electrodes in many applications have been well received among electrochemical fraternity. However, there is a need to find alternatives which are less costly and perform as good as the pure substrate electrodes. In this study we applied the pencil lead as a working electrode for formaldehyde determination in water. Variety of parameters for HS sampling conditions such as adsorption time, adsorption temperature, ie. and voltammetric measurement conditions such as scan rate, supporting electrolyte i.e were optimized.

REFERENCES: