PHOTOELECTROCHEMICAL SENSORS FOR DETERMINATION OF BIOLOGICALLY AND ENVIRONMENTALLY IMPORTANT COMPOUNDS

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The photoelectrochemical sensor is a new kind of developing device which has great application potential for analytical chemistry due to its remarkable sensitivity, easy miniaturization and integration, good selectivity, simple equipment and its portability. In photoelectrochemical sensors, generally, the electrode surface is modified with photosensitive organic materials, or transition metal complexes. Recently, semiconductor nanoparticles such as TiO\textsubscript{2} nanomaterial, quantum dots (CdSe/ZnS nanocrystals) have been the focus of considerable interest in the construction of photoelectrochemical sensors due to their high photosensitivity, large specific surface area, high surface adsorption, good chemical stability and environmental safety. During the photoelectrochemical process, firstly the electrode surface is irradiated with a suitable light source. Then the photocurrent, which is generated by electron transfer between some of the substances and the excited states of photosensitive materials on the electrode surface, is monitored. The magnitude of photocurrent is related to the wavelength and intensity of the exciting light, the property of the photoelectric materials, the type and shape of electrode, the amplitude of bias voltage, and the composition of electrolyte [1-2]. In this presentation, we will describe studies on photoelectrocatalytic oxidation and determination of some biologically and environmentally important molecules such as ascorbic acid, NADH, sulphide, pesticides, etc. [3-8] and also construction of a photobiosensor for some compounds such as glucose using chemically-modified electrodes [9,10]. Recently, our research group has been focused on photoelectrochemical sensors in the Flow Injection Analysis (FIA) system. We will also mention photoelectrochemical flow cells and photoelectrochemical sensors in FIA System [3-5].

KEYWORDS: Photoelectrochemical sensor; modified electrode; flow injection analysis

REFERENCES: