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Exploitation of conducting polymers as bio-medical sensor

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Nowadays various types of sensors are available in the market. Early days the inorganic compounds like SnO2, TiO2, etc. were used as gas sensors. SnO2 is the prominent one and versatile metal oxide wieldy used as sensor. Now the place of Metal Oxide Semiconductors (MOS) is replaced by conducting polymers such as polypyrrole, polyaniline, polythiophene, etc. and their derivatives. These are the prominent candidates today for exploitation of sensors because of their inherent properties like easy preparation, ruggedness, long life, high sensitivity, selectivity, stability, cost effective, miniaturation and eco-friendliness. Amongst these sensors especially polypyrrole and polyaniline are used on large scale right from kitchen to the scientific devices, including bio-medical appliances. The polyaniline is potentially used for detection of some peculiar diseases like gonorrhoea (one of the HIV group) as bio-medical sensor. While using as bio-medical sensor the main principle of working behind this is, that it will acts as both immobilization matrix as well as physicochemical transducer i.e. the change in chemical signal into electrical signal. Mostly doped polyaniline is used as glucose bio-sensor, DNA, uric acid, cholesterol, pyelonephritis (kidney infection) and immunosensor. The polypyrrole is equally important because of some special characteristics. The polypyrrole and polyaniline are having potential applications as an immunosensor which finds alternative technique in clinical diagnostics. These polymers are able to detect the interaction between an antibody and an antigen. Gonorrhoea and its related clinical syndromes are the most common bacterial Sexually Transmitted Disease (STD). The polyaniline-Au (PAni gold nanocomposite) is the important material which detects this type of STD. The PAni-Au-ITO electrode can be used as genosensor specifically for STD because of its increased surface area. A review has been made regarding exploitation and utility of conducting polymers and their derivatives for bio-medical sensor application. It is observed that these type of materials especially polyaniline and polypyrrole are most prominent and suitable candidates for preparation of various types of sensors including gas sensors and bio-medical sensors. These sensors are very stable and have more sensitivity than the oxide materials.

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