Composites of polypyrrole for metal detection in water

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Abstract

In the adsorption technology graphene in its modified form and its composites has a special position. It's used to remove and detect the heavy metals like Cadmium (Cd).Fluoride ions are removed by using a polypyrrole magnetic Nano composite by applying magnetic field.

Keywords: Heavy metals, Cadmium, Graphene.

1. Introduction

The pH of uncontaminated water is between 5.0 to 7.0. It is colorless and has no odor and is also tasteless liquid. As water is essential for whole living world it provides micro and macronutrients to the whole world **[1]**. The heavy metals which are present in water come from the industries, household sewage are very much hazardous **[2]**. Presence of heavy metals in excess amount lead to the kidney damage, hormonal imbalance, central nervous system gets damage and because of this IQ is reduced, loss of coordination, organs don't function properly Cd is very much hazardous heavy metal which lead to the health problems it is very much toxic and can cause cancer. Contamination of drinking water takes place mainly by the impurities of cadmium which is present in the ore form, water heaters etc **[3]**. Fluoride ions are present in ground water and it is a natural process. Under geological and hydrogeological circumstances it is affected. Fluoride is having a vital role in humans and animals **[4]**. But fluoride is also harmful for living organisms[3]. Fluoride is beneficial for dental and bone growth when it is present in small amount that is 0.5-1.0mgL^{-1}.But when the concentration of Fluoride exceeds i.e 1.5mgL^{-1} because of higher concentration it leads dental and skeletal fluorosis. Heavy metals are removed from the solution by the adsorption process. Adsorption process can be enhanced by electric fields, ultrasonic waves, irradiation and magnetic field.

2.0 PPY composites

2.1 Synthesis of PPy/Fe_3O_4

Magnetite is added to deionized water and for about 30 min the solution is ultrasonicated, Pyrrole and $FeCl_3$ are added into the nanoparticles and for about 5 minutes its shaking is done continuously and after this at room temperature the solution in kept for three hours. Black powder is formed and is washed continuously until the substance become colorless. Loss of water Nano composites should take place at 60 °c in 24 hours **[5]**.

2.2 Synthesis of PPy/ CNT

Mariana Ionita has reported the composites of polypyrrole with carbon nanotube (CNT) as a corrosion inhibitor **[6]**. Hong-Mei Xiao *et al* created PPy mixtures by four methods by adding flavors and create out that the magnetic flavors were accountable for the electromagnetic belongings of the composites of polypyrrole. They described the iron oxide -polypyrrole composite showed superb magnetic properties **[7]**.

3.0 Conclusion

Cd is more toxic as it leads to the cardiovascular, neurological and carcinogenic disorders. The detection and removal of heavy metals take place. Concentration of adsorbate , contact line grain size and surface characterization of adsorbent. The composite of graphene helps in the detection and removal of heavy metals. Magnetic field is applied for the removal of heavy metals. Magnetic field is applied for removal of flouride ions from waste water. The fluoride ions are removed under the influence of magnetic field.

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