

New Techniques of Waste Water Treatment

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Abstract: We demonstrate the filtration of water by nano technology, Carbon Nanotubes (CNTs). The unique property of Adsorption in CNTs provide the passage of water by retaining all the impurities inside the cylinders. By arranging the size of CNTs we retained any type of impurity through it. Rather than in conventional method, where reverse osmosis requires enough backward pressure to move the liquid in backward direction. But, here only “push” will be applied. Life span of conventional method is limited but, for CNTs it is not. The CNTs has the ability to remove toxins and harmful contents from water of any type. Reusability, Capability and it’s unique fibrous structure of CNTs pave the way for the implications of CNTs in Waste Water Treatment.

1. INTRODUCTION

As in the present scenario, water is the basic necessity for all type of life existing in our planet. If we are going to run out of it, there will be world war 3rd so it is badly needed to find out the ways from where we can get water for our sustainable development. Now, some of the measures that have been taken to find the various ways through which water can be preserved for our future.

The recent development in the technology has boomed up with newer invention in carbon nano technology which ultimately helps in getting purified water from contaminated water.

Conventional methods are used to minimize the water scarcity by purifying industrial waste water, Household water, contaminated water but, there are certain limitation of it. After a certain period of time, they becomes unusable, due to many reasons. Firstly, Polluted water contains many heavy metals which leave deleterious impact on waste water treatment plant. Secondly, They are not much capable to make the water potable by removing pathogens from contaminated water.

On the second hand, advanced membrane filtration technique (like Ultrafiltration, Nanofiltration, Reverse Osmosis) demands the backward force to move the liquid in backward direction which increases the cost of treatment plant and it doesnot have any reusability. But, in the recent years nanotechnology brought the invention in water filtration by its property of adsorption due to which it removes heavy metal ions like Cr³⁺, Pb²⁺ etc.

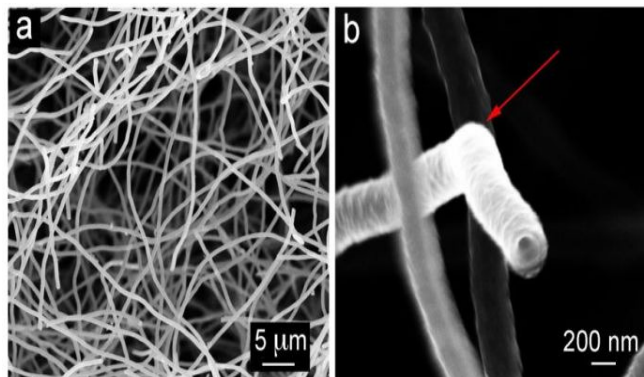


Fig. 1: Fibrous structure of CNTs helps in treatment of Water.

Beyond all the conventional Treatments, Contaminated Water contains cynobacterias which exploits the taste and odour of drinking water.

So, We can say that conventional method has very low efficiency for make water potable.

2. CNTS AS ABSORBANTS FOR REMOVAL OF ORGANIC AND INORGANIC POLLUTANTS

Absorbents	Pollutants	Comments
Graphised CNTs	1,2 DichloroBenzene	Due to have rough surface adsorption made easier on CNTs.
Amorphous Alumunium oxide supported on CNTs	Flouride	Adsorption of fluoride ions becomes quite faster.

Absorption is the simple and efficient method posseses by the CNTs, Activated Carbon (ACs), Carbon sheets etc. But, in the water treatment plant we prefers to use Activated Carbon fibrous structure. Its pores helps in the adsorption of toxic materials. As a result, ACFs posses high adsorption Capacity than ACs for water treatment.

3. HOW CARBON NANOTUBES USED FOR TREATING DRINKING WATER?

CNTs provides the enormous advantage over the membrane system of the current membrane technology.

Water is passed at a high rate of flow just by applying the external force “push” since they possess many additional property of adsorb toxic materials. Presently, it is very limited in use since it requires the development of well defined carbon structure lined up facing in one direction all right next to each other in filtration unit. The variation in size of H₂O molecule and of the impurity pave its way to use CNTs in water Treatment. It is achieved by designing the mesh or mat of carbon stack to one another of desired size.

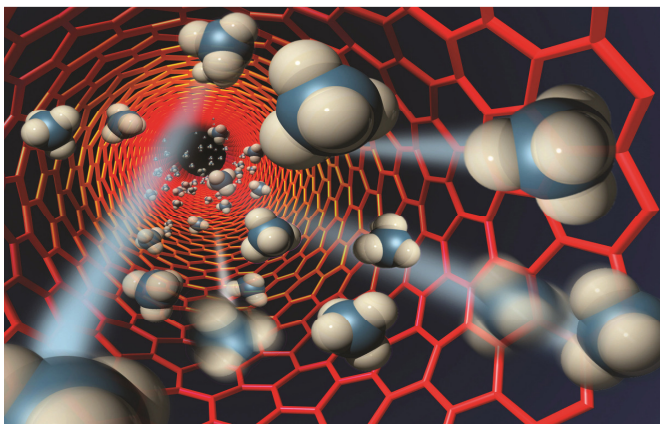


Fig 2. Red colour shows the CNTs and Blue and White colour shows the water molecule.

Here, Mechanism of water entering in CNTs is shown above in which it passes through CNTs by retaining all impurities on the CNTs.

4. CARBON NANOTUBES FILTERS: PRACTICAL CONSIDERATIONS

CNTs serves as the excellent media for concentrating and removal of biological contaminants from water systems.

- 1. Cost :** Since due to the development in nano technology, the use of CNTs increased very much in every field so, its cost get reduced for future aspects.

- 2. Reusability:** CNTs filters are reusable by using certain simple thermal regeneration technique which is quite cheaper than polymeric filtration.

- 3. Feasibility:** It is quite feasible for mass production of potable water at reasonable low pressure. CNTs expressed high mechanical stability than any other membrane since it can withstands upto pressure of 1atm.

5. CONCLUSION

- CNTs possesses superior adsorption capacity.
- It is good to remove all bacterial contaminants.
- Continuous production of CNTs diminishes the cost in coming years.
- For a particular amount of CNTs it does not cause any impact on the environment.

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