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NANO TECHNOLOGY BASED WATER PURIFICATION USING PRO-E

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ABSTRACT :-This paper deals with recent advances and application nanotechnology for water purification. These techniques extend from design of membranes, Nano materials are applied on the membrane, the research advances for the use of metals, mixedoxides, zeolities, nano carbon powder and carbon compounds in water purification are also reviewed. Finally the water quality, cost of the membrane and water flow rate was discussed.

Keywords – Membrane,Nano materials,water purification, nano carbon black powder, nano technology

1. INTRODUCTION

Nanotechnology is the study of manipulating matter on an atomic and molecular scale. Generally, nanotechnology deals with developing materials, devices, or other structures possessing at least one dimension. sized from 1 to 100 nanometers. Quantum mechanical effects are important at this quantum-realm scale.

1.1 Nano materials and water filtration:

Membrane processes are considered key components of advanced water purification and desalination technologies and nano materials such as carbon nano tubes, nano particles, and dendrimers are contributing to the development of more efficient and cost-effective water filtration processes

1.2 Membranes:

There are two types of nanotechnology membranes that could be effective: nano structured filters, where either carbon nano tubes or nano capillary arrays provide the basis for nano filtration; and nano reactive membranes, where functionalized nano particles aid the filtration process.

2.Chemical Vapor Decomposition (CVD) Coating

CVD is capable of producing*thick*, *dense*, *ductile*, and *good adhesive coatings* on metals and non-metals such as glass and plastic. Contrasting to the PVD coating in the "line of sight", the CVD can coat all surfaces of the substrate.

2.1 Conventional CVD Coating

In order to make thin films polyvinyl alcohol is mixed with water. Then the solution is heated for 5 minutes. After that it is added little by little to nano carbon black powder until it becomes thin fluid like gel. Then the gel is poured between two mirror plates.At the end the thin film is placed on the top of the membrane.

FIGURE:Membrane with nano material

Figure:nano thin flims

3. Properties

3.1. Properties of nano carbon black powder

The finest analog of industrially used filter for

Polymer composites.It have some properties.

Table 3.1

Average particle size	Ca.13 nm
Specific surface	Ca.550m2/g
Ash content	<0.02%
Bulk density	Ca.120g/L

3.2 Physical Properties *Polyvinyl Alcohol*

Table:3.2

Form	granular
Color	white
Hydrolysis, mole %a	99.0-99.8
Saponification number	3-12
Residual polyvinyl acetate, weight %	0.5-1.8
Viscosity, mPa·s (cP)c	27-33
Solution pH	5.0-7.0
Volatiles, % max	5
Ash (as Na2O), % maxa	1.0
Bulk density, kg/m3 (lb/ft3)	400-432 (25-27)
Specific gravity	1.30
Specific volume, m3/kg(in3/lb)	7.7 x 10-4 (21.3)
Hardness, Shore unplasticized	>100
Specificheat, J/kg·K(cal/g/°C)	1674 (0.4)

4.RESULTS AND DISCUSSION

4.1RAW WATER VS VALUES

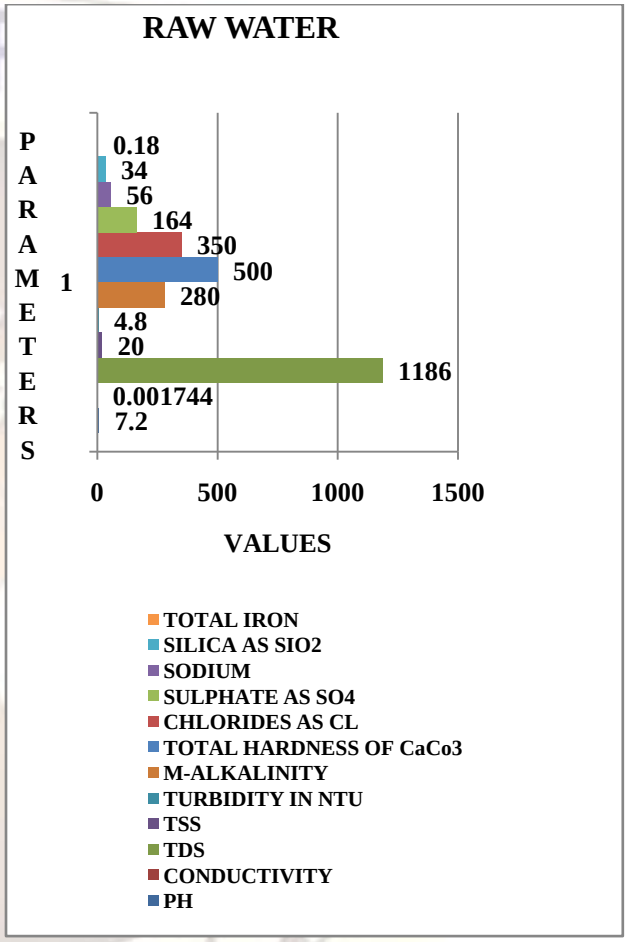

Figure: 4.1 RAW WATER VS VALUES

The x axis represents the parameters which are all presents in the water, Y-axis represents the values (quantity) available in the water. from the above (fig 4.1) graphcal results the TDS, total heardness of CaCo3,and clorides are high.

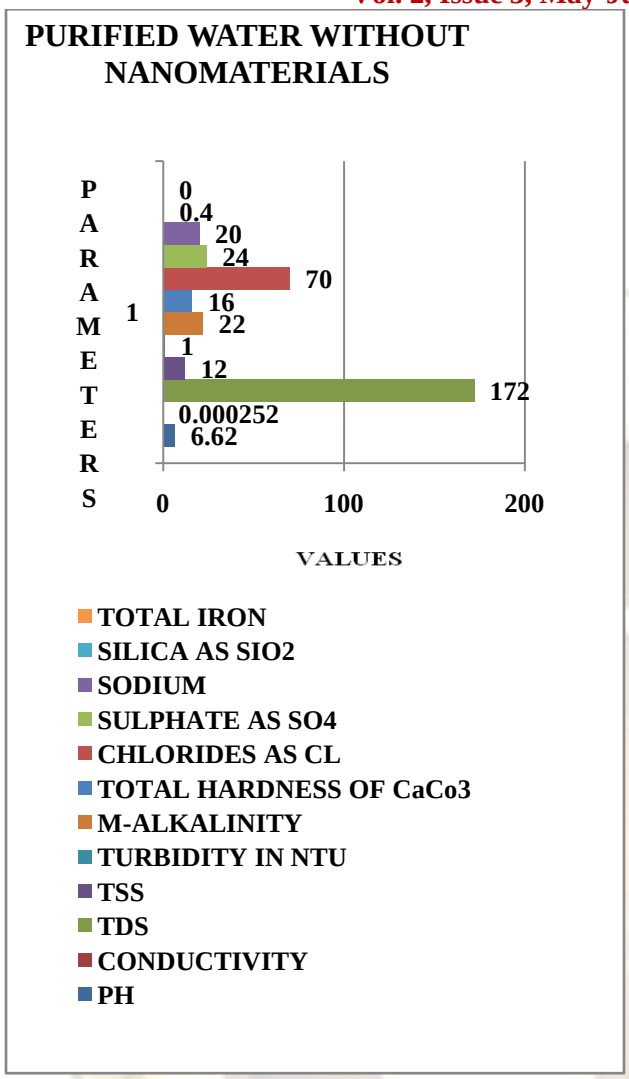

Figure 4.2 purified water without nano materials

The x axis represents the parameters which are all presents in the water, Y-axis represents the values (quantity) available in the water. from the above fig 4.2 graphcal results the TDS, total heardness of CaCo3,and clorides are high, but it has been reduced 50-88% after purification of water.

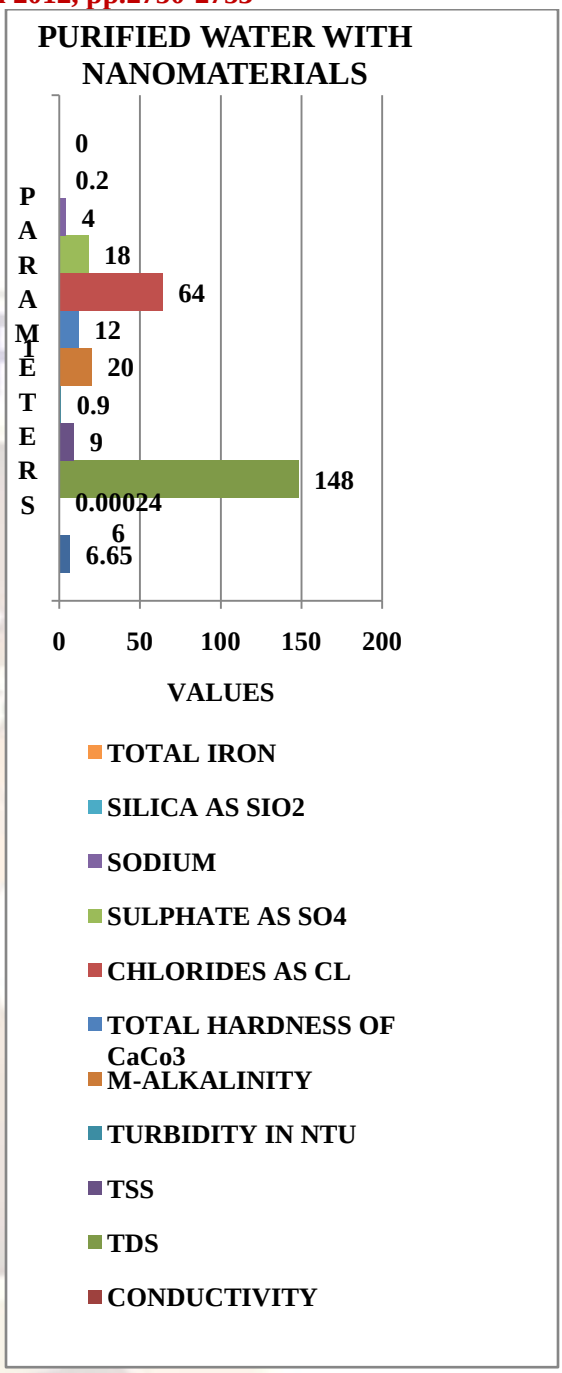

Fig 4.3 purified water with nano material

The x axis represents the parameters which are all presents in the water, Y-axis represents the values (quantity) available in the water. from the above fig 4.3.graphcal results the TDS, total heardness of CaCo3,and clorides are high, but it has been reduced 85-95% after purification of water with nano materials based membrane.

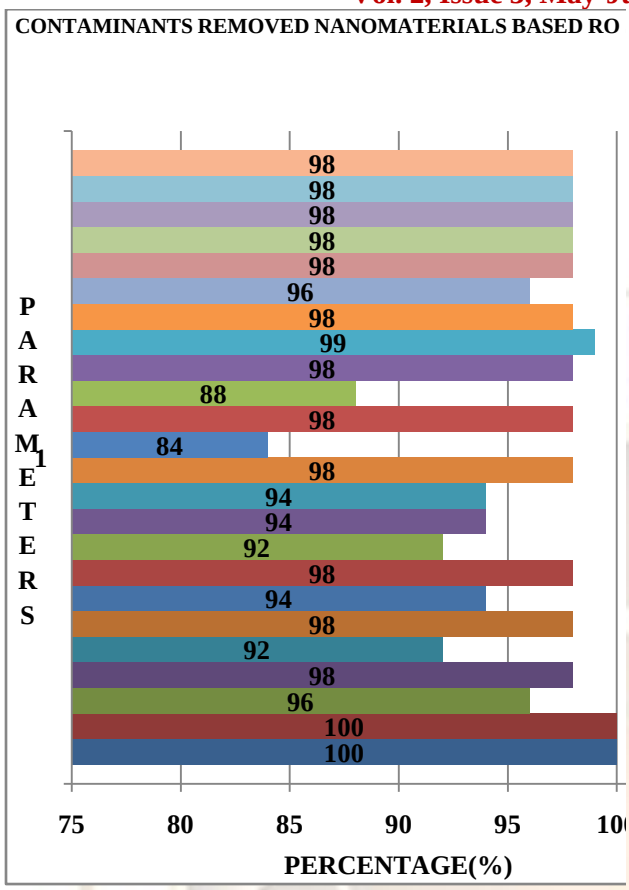

Figure 4.4.Parameters as Functions of percentage

The x axis represents the parameters which are all presents in the water, Y-axis represents the percentage which is removed after purification of the water. from the above (fig 4.4) graphcal results the TDS, total heardness of CaCo3,and clorides are highly removed.

CONCLUSION:

Among the various technological innovations for water purification, nanotechnologies are emerging with great potential and very accurate for the water purification. This project deals with recent advances and application of nanotechnology for water purification. The optimally designed membrane with nano materials which has been applied the membrane and it was replaced existing conventional membrane. Then the final results are compared with existing RO systems, the results are proved that the water quality improved.

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