SCMS
School of Engineering & Technology

INSTAQUA

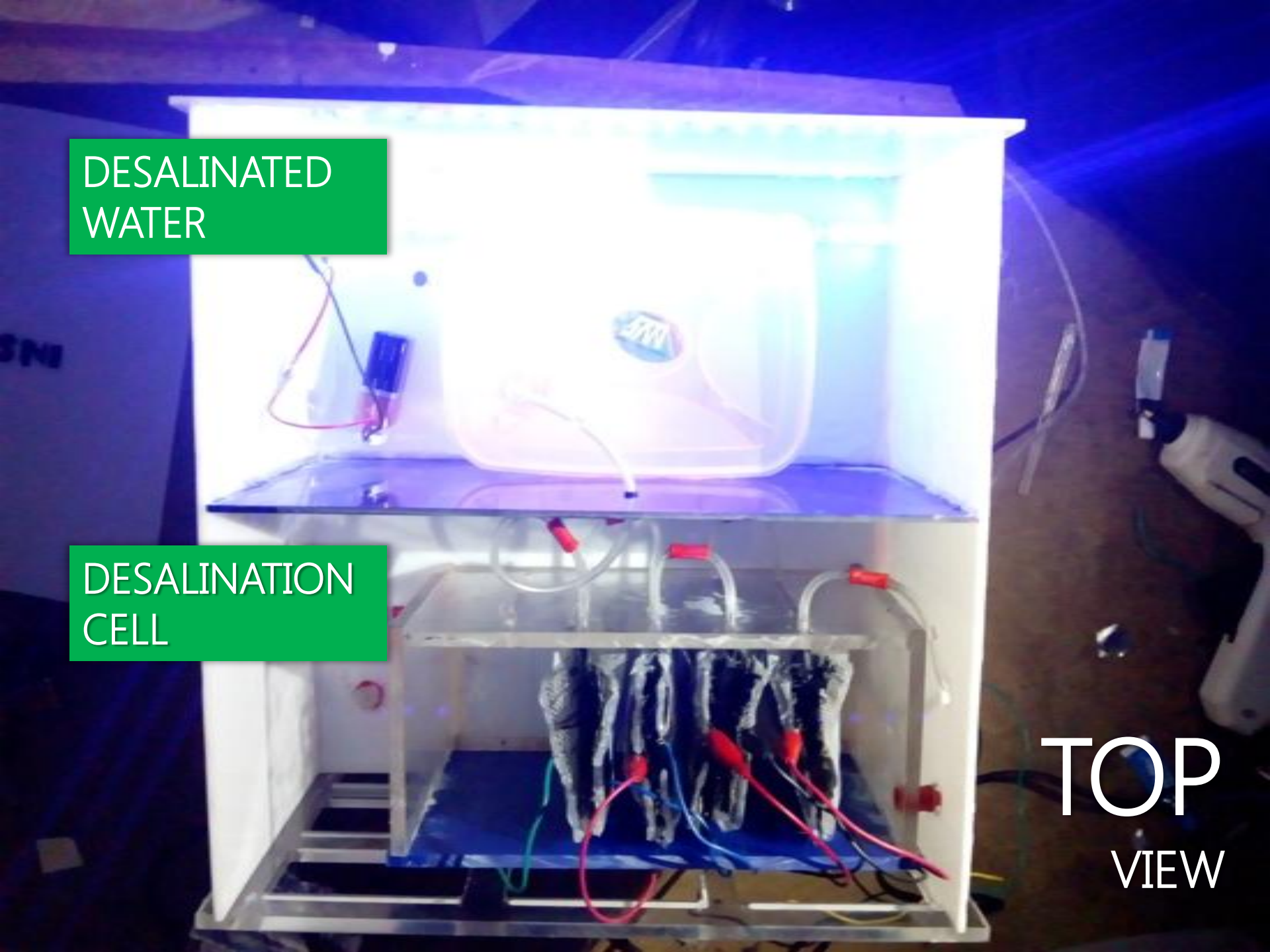
PORTABLE DESALINATION UNIT

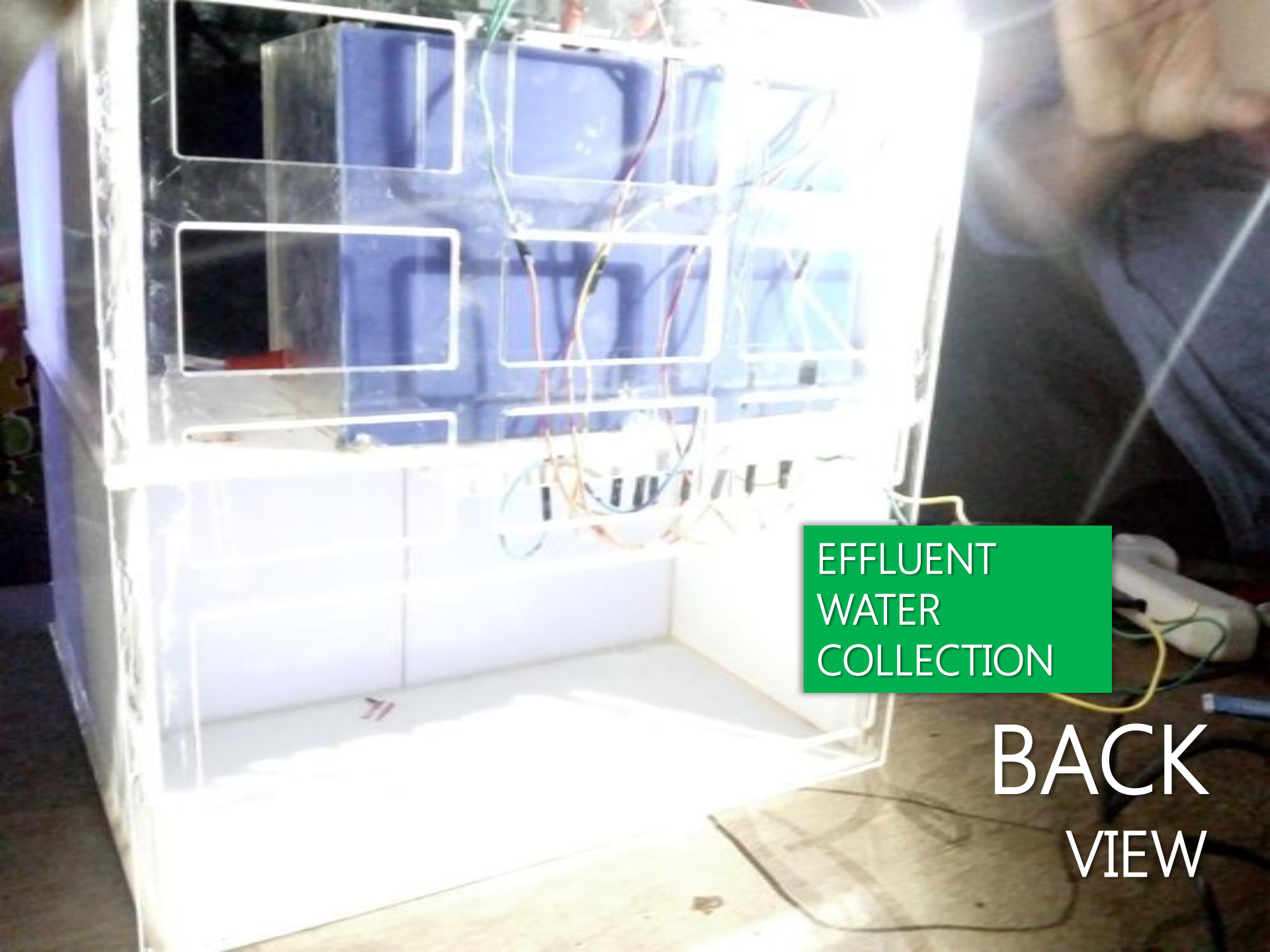
OBJECTIVES

- To develop an Energy efficient **Desalination unit.**
- Incorporate modular design to accommodate device **portability.**
- Develop a **Recyclable electrode** for desalination to reduce carbon footprint.

INSTAQUA

IN OPERATION


DESALINATED WATER
DESALINATION CELL
TOP VIEW

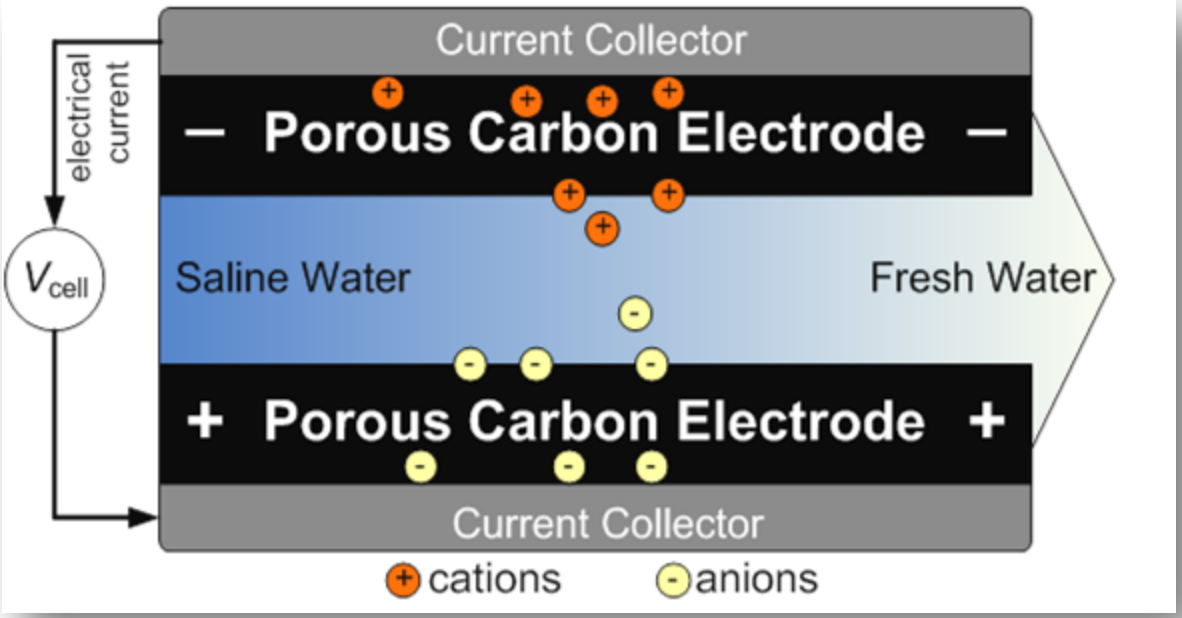

EFFLUENT
WATER
COLLECTION
BACK
VIEW

FRONT
VIEW

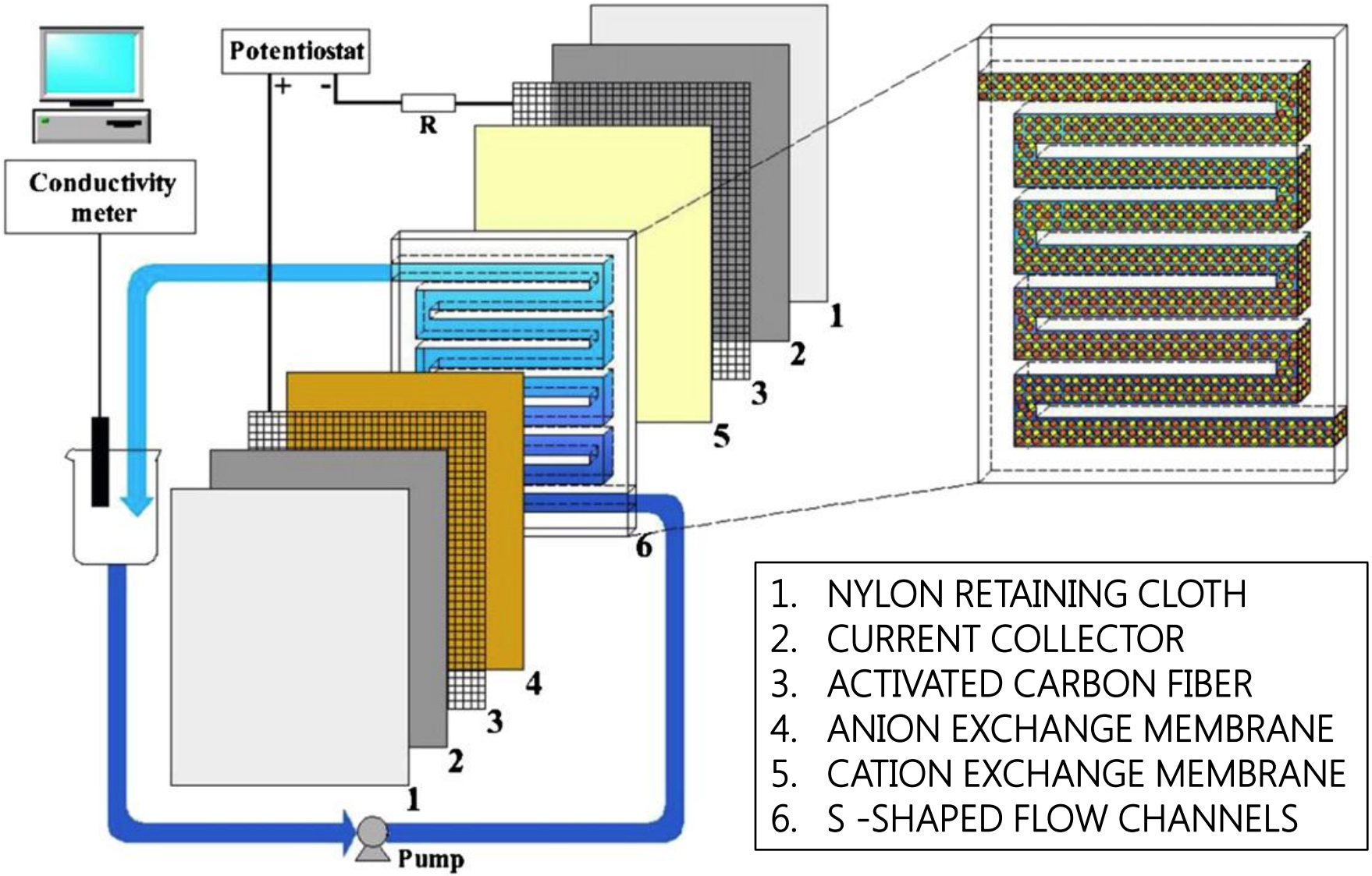
APPLICATIONS

- Can be implemented where water is brackish or saline.
- Can be used to reduce salinity of irrigating water.
- Can be used for pre-treatment in RO to reduce energy consumption.
- Can produce potable water for drinking and other purposes.
- Emergency water desalination unit incase of floods or calamities.

METHODOLOGY



WE ARE USING COMMERCIALLY AVAILABLE CARBON FIBER AS POROUS CARBON ELECTRODE THROUGH ACID ACTIVATION.



1. NYLON RETAINING CLOTH
2. CURRENT COLLECTOR
3. ACTIVATED CARBON FIBER
4. ANION EXCHANGE MEMBRANE
5. CATION EXCHANGE MEMBRANE
6. S -SHAPED FLOW CHANNELS

S –SHAPED ACRYLIC FLOW CHANNEL

ION EXCHANGE MEMBRANE COVERED CHANNEL

HNO3 ACTIVATED CARBON CLOTH

OBSERVATIONS

Sl.No	Voltage (V)	Current (A)	Time (min)	Conductivity (µS)	Salinity(PPT) at 30˚C
1	0	0	0	70910	44
2	1.5	0.03	10	44300	25.9
3	1.5	0.02	20	31100	17.516
4	1.5	0.01	30	29150	16.313

INSTAQUA Vs. RO

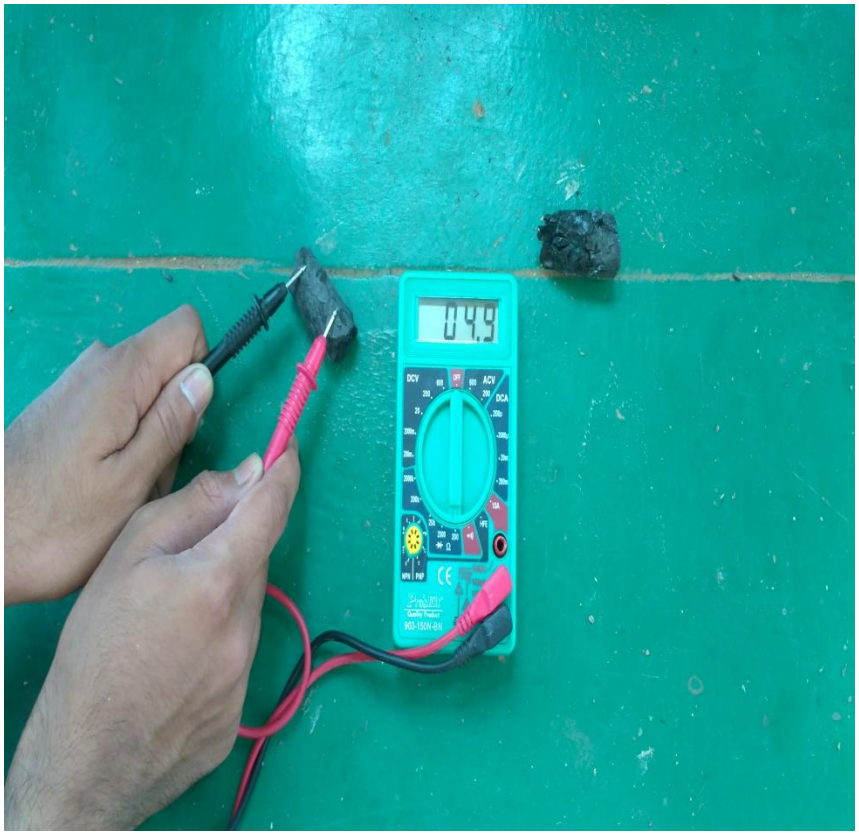
	INSTAQUA	REVERSE OSMOSIS
Power consumption	0.1 – 0.5 kWh/m^3	6.6-9.3 kWh/m3
Cost per liter	50 – 60 Paise/Liter	1.5Rupees/Liter
Recovery	More than 80%	Less than 70%
Weight	2 Kg	Available only in industrial sizes
Operating cost	Low	High
Remarks	RECYCLABLE ELECTRODES	EXPENSIVE MEMBRANES

PRODUCTION COST

COMPONENTS	COST
ELECTRODE (400cm^2)	800
CASING (MATERIAL + MANUFACTURING)	500
ELECTRONICS*	500
FITTINGS	100
MISCELLANEOUS	100
TOTAL COST	*2000**

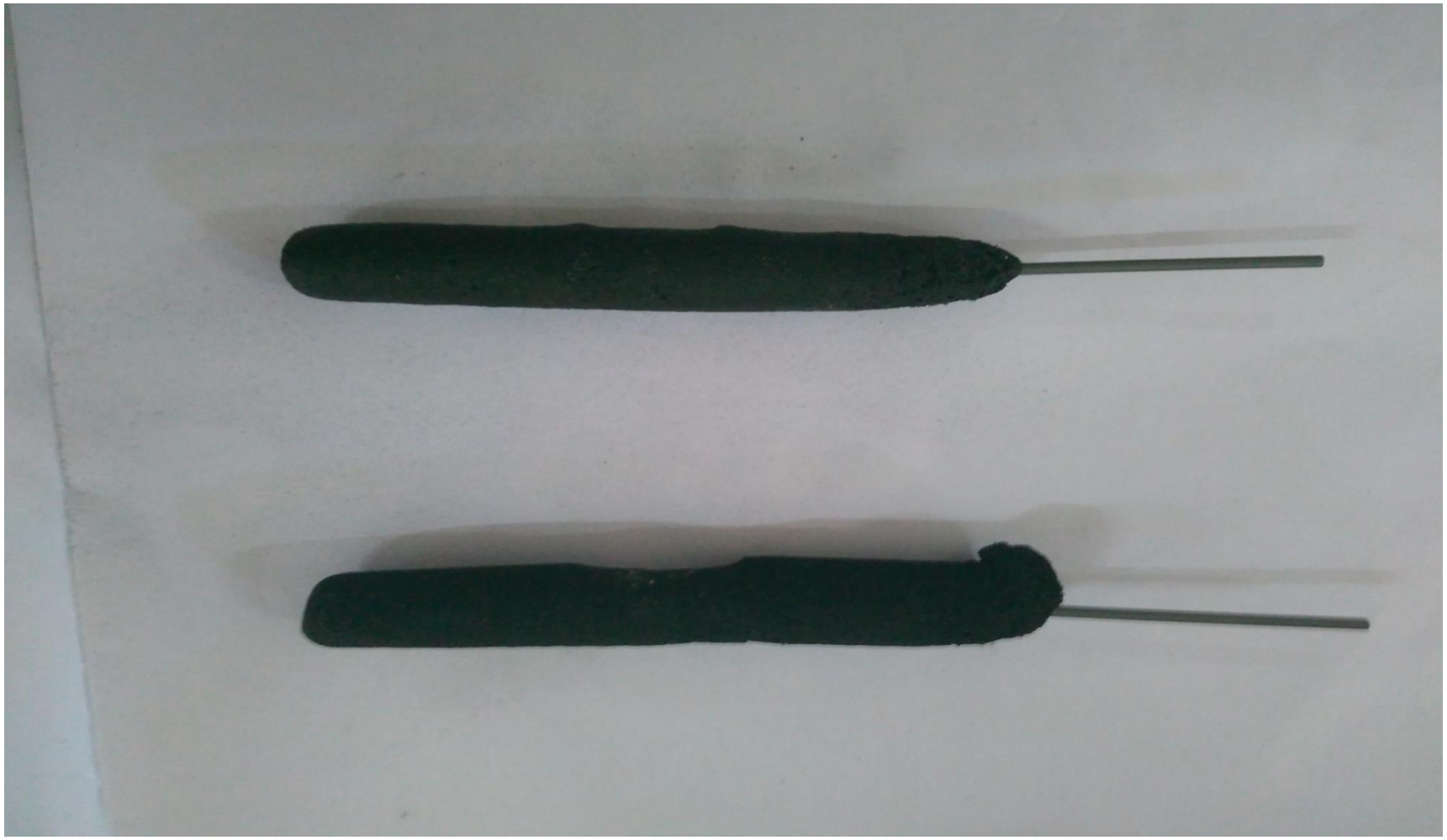

RECYCLABLE
ELECTRODES

CHARCOAL ACTIVATION

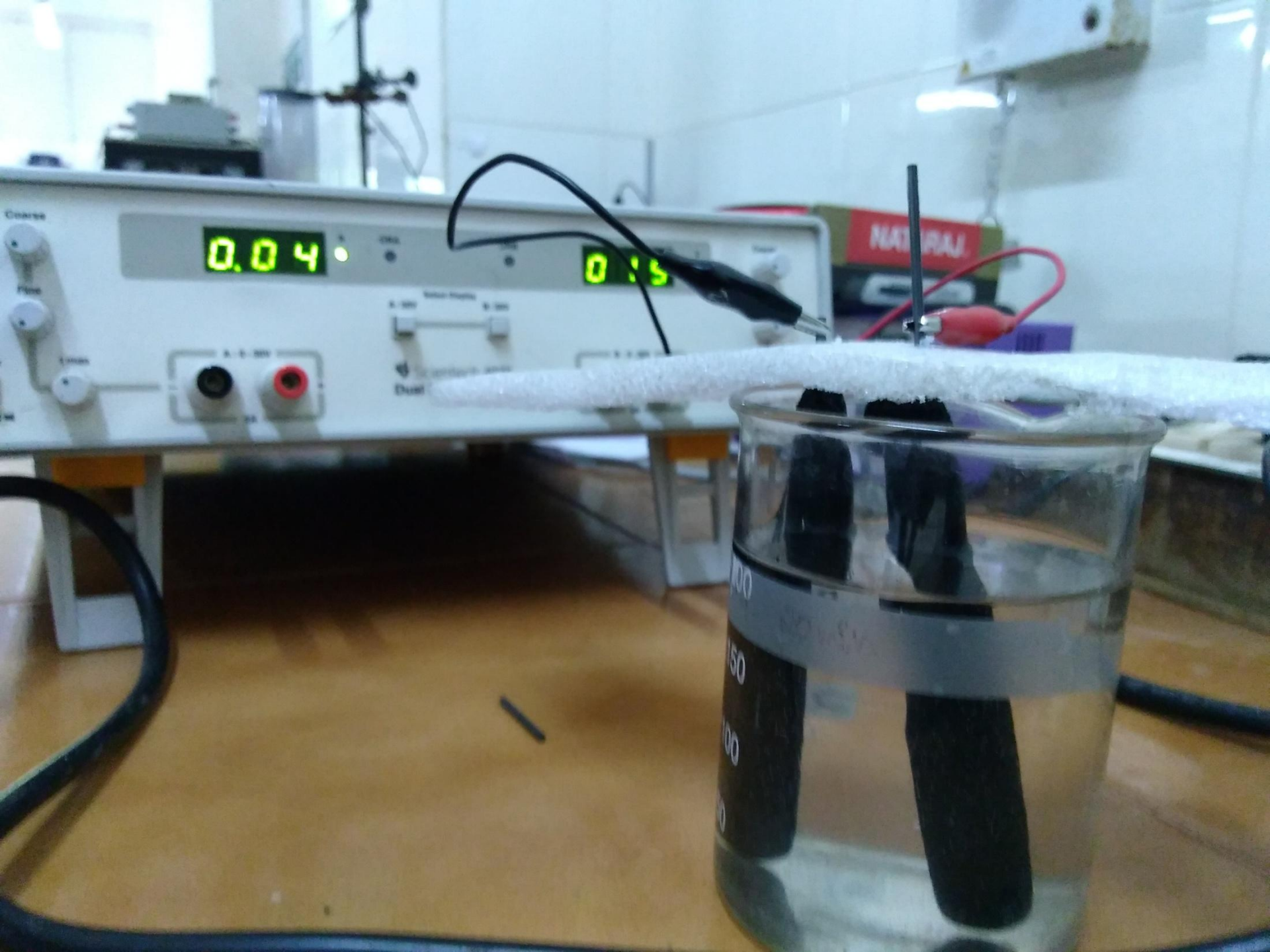


PREPARATION

RECYCLABLE ELECTRODE



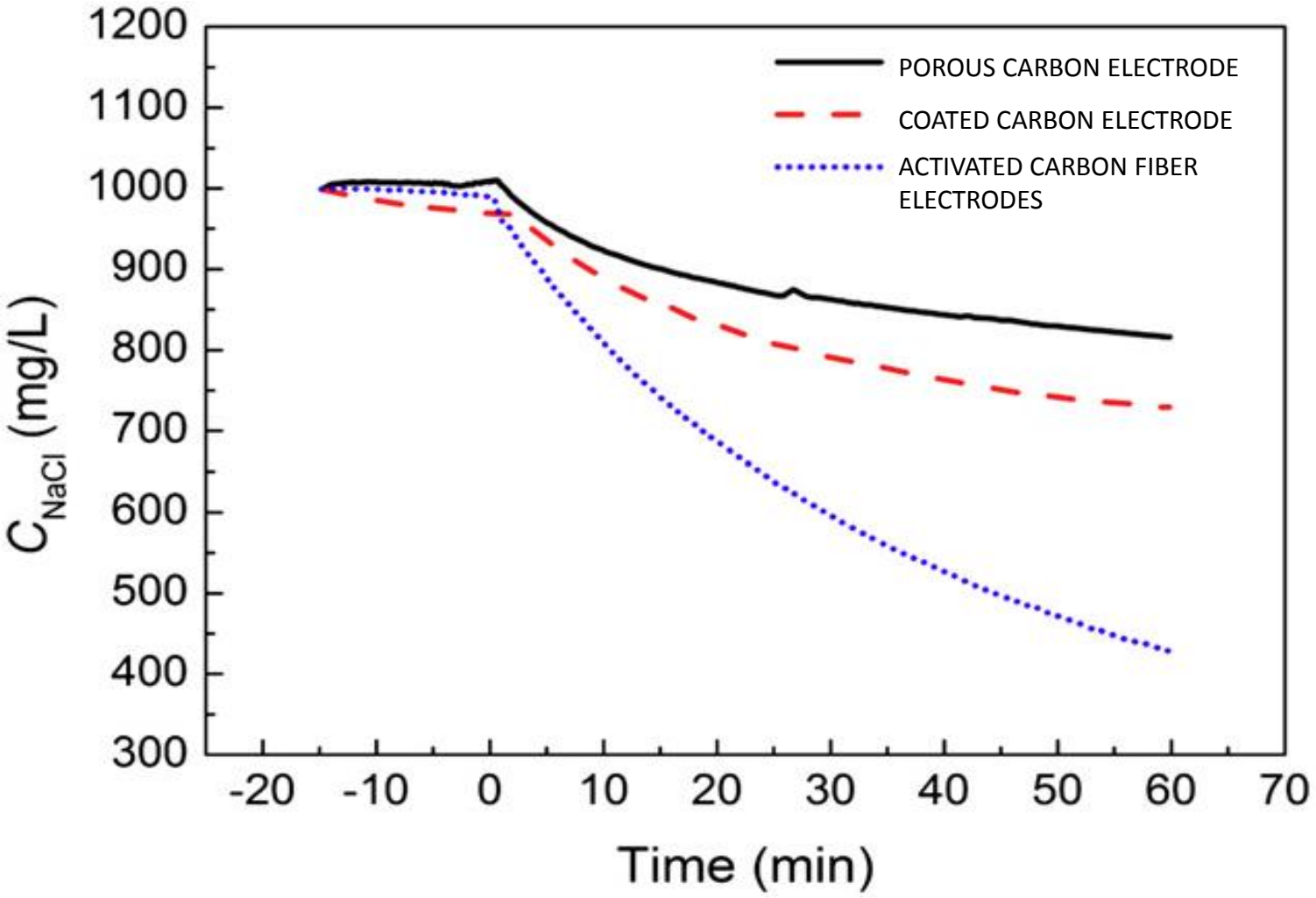

HAVELL'S
0.00
01.4
Scientech 4075
Dual Power Supply
1MLH MAGNETIC STIRRER
HEAT
Mfd. By : Remi Equipments Pvt. Ltd.

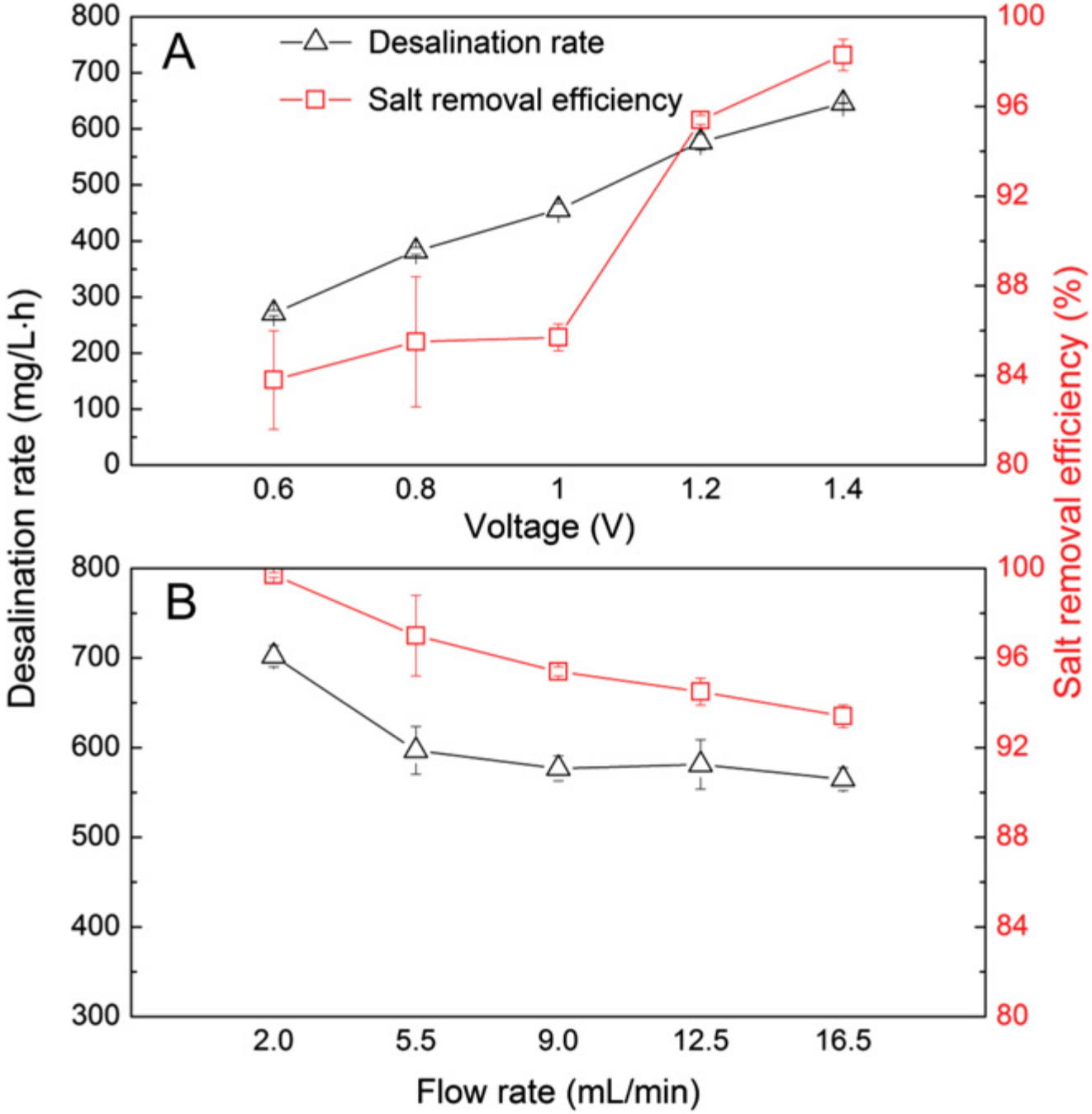

0.04
0.15
Coarse
Fine
Dual

RESULTS

ELECTRODE MATERIALS	AREA OF ELECTRODES (CM^2)	INITIAL NaCl CONCENTRATION	APPLIED VOLTAGE	SALT REMOVAL EFFICIENCY
MESOPOROUS CARBON	50	35	1.2	35%
ACTIVATED CARBON FIBER ONLY	50	35	1.2	54%
ACTIVATED CARBON FIBER WITH MEMBRANES	50	35	1.2	73%
CARBON PASTE ELECTRODES WITH HYDROPHILIC COATING	50	35	1.2	BEING RESEARCHED

CONCENTRATION VERSUS TIME




A
Desalination rate
Salt removal efficiency
Desalination rate (mg/L·h)
Salt removal efficiency (%)
Voltage (V)
0.6
0.8
1
1.2
1.4
B
Flow rate (mL/min)
2.0
5.5
9.0
12.5
16.5