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"APPLICATION OF SUPERCONDUCTOR MATERIALS IN POWER STORAGE SYSTEMS"

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ABSTRACT: An increase the demand of the electrical energy in the world with increase the problems are generated in Public Sectors, domestic, indusial, and small industrials are applications of electric power. I think about the energy storage is the capture of the energy is produced at one time for used at a later time to produce the imbalances' of the energy between energy demand and electric energy is production. The energy storage devices in used the superconductor materials like i.e. Accumulators and Battery in electric energy comes in smalls and multiple forms including radiation, chemical and gravitational. Increase the capacity of the energy storage in the Accumulator and Battery in magnetic field is a vector field that improving the magnetic influence on moving the electric charge is electric currents and magnetic materials moving change in the magnetic materials in generated the magnetic properties in the superconductor materials are used in wires and electric power transmission lines. Analysis of AC and DC current in the Superconductor materials in very high superconductivity of the material is electric properties in electric resistance, magnetic flux fields, electric and metallic superconductor materials are used electric power transmission with electric resistance is zero. Superconductor materials, Accumulator and Battery both an increase the charge and discharge capacity at 96% approximate and efficiency also increase applied inverter/ Rectifier and the superconductor materials and magnetic materials energy storage (SMES), the high temperature superconductor materials (HTS) and low Temperature superconductor material (LTS) increase the energy storage capacity.

Key Word: Superconductor Material, Application of Superconductor materials, Accumulator and Battery, Electric power AC & DC, Efficiency of Accumulator and Battery

1. INTRODUCTION

The superconductor materials are used in Accumulator and Battery both are energy storage systems is the capture of energy produce at one time for used at later time to produce improvements. Of energy storage battery and accumulator and increase electric power demand and energy production systems the energy storage device that the electric power generation system and electric power transmission lines is made by the superconductor materials is high conductivity and electric power devices accumulator and battery in comes in smalls and multiple form it is included in electric power storage accumulator and battery in storage capacity is increase systems. The superconductor Materials and Magnetic Materials Electric Energy Storage (SMES) is the high efficient and round – trip is increase the efficiency is greater than 96% Electric energy comes in smalls and multiple forms including Radiation, chemical and gravitational of the magnetic field is vector field and is estimation of the magnetic influence on the moving electric charges,

electric currents and magnetic materials moving charge in the current currying in conductor magnetic materials.

1.1: Electric power AC & DC

Electric power is the very save Power to easily transfer one place to another and loss of electric power only loss of Human mistake and Technical issues there are divided electric power in two parts (A) Alternating Current AC Power, (B) Direct Current DC Power

(A) Direct Current (DC) Power: Direct current is one-directional flow of electric current is called as direct current of electric charge. Direct current is the examples of an electro chemical cell is a prime examples the superconductor materials are used in electric power storage system superconductivity of the materials properties of the electrical current properties, and the electrical resistance vanishes and magnetic flux fields are unlike an ordinary metallic metal conductor and superconductor were resistance is zero in the superconductor materials.

(B) Alternating Current (AC) Power: Alternating current is Electric powers this is current which are periodically reverse direction and change of the magnitude continually with time in the current to direct current (DC) is flow only one direction and the Alternating current (AC) is the from which electric power is delivered to the business and resistance inverter/ Rectifier to the transform alternating current (AC) into direct current (DC) and direct current (DC) is converted into Alternating current (AC) back to alternating current power are losses is only 1- 3.5 % energy loss in each direction.

Superconductor materials and magnetic energy electrical energy storage (SMES) is highly efficient and round- ships increase the efficiency is greater than 90%–96%. The Application of the superconductor materials are used in the electric energy by the transmission wires of energy in the made by the superconductor materials and conductor materials is used as also when the below their the transition temperature of the superconductor material is used made of electric power transmission lines with the zero resistance. Resistance is the mean properties of the Electrical Superconductor materials in the below their most important used in such as niobium and titanium are used in the commonly used high temperature of the superconductor materials.

High- Temperature Superconductor (HTS) in the reasons have higher –critical temperature the flux lattice melting take place in the moderated the magnetic properties fields around a Temperature lower than the critical temperature low-Temperature of Superconductor (LTS) in the application of the temperature at 75K, 22K and 4.2K. It is the increase in the life of superconductor materials wires in the Refrigerator Requirements here is the finding the Electric Power to operate the Refrigeration system as the store energy increases by the factor of 110. The refrigeration cast only goes shaving of Refrigeration for an (HTSC) system is larger 55% - 72% than the LTSC systems.

1.3: Superconductor Material:

Superconductor materials and superconducting properties are consisting of the materials is electrical energy transmission lines with the zero resistance and hence not release heat and sound energy is known as superconductor materials like i.e. Tungsten, Thorium, Mercury, Cadmium, Aluminum, Vanadium and Lead etc.

1.4: Application of Superconductor materials:

Superconductor materials wires are used in Refrigerator; these are used in Electrical Machine, generators, and particle accelerators, Electrical Power transmission, Medical Application, Medical Equipments made in medical industries, Electrical Motor, Computing, Transportation, Memory or storage Elements, Maglev Trains, Nuclear magnetic resonance (NMR), Magnetic resonance imaging (MRI) Machines, Magnetic confinement fusion reactors etc.

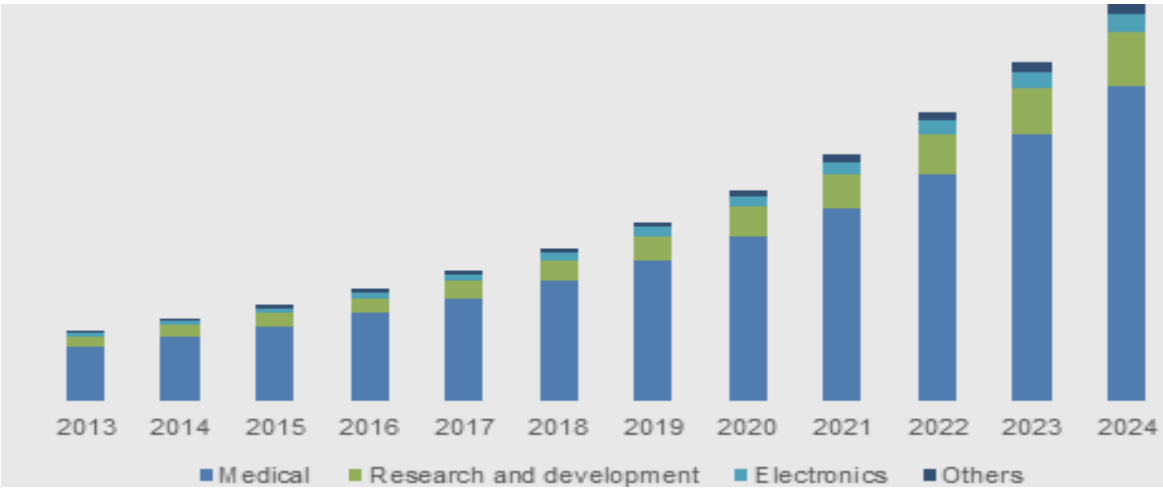

Figure.1.1: Application of Superconductor materials are increase

Superconductor Materials are used in Electric power transmission wires and cable and electrical and electronic Equipments manufacturing Industries.

1.5: Accumulator and Battery

Accumulator and Battery Bothe are electric energy storage devices in application of the superconductor Materials. An Accumulator this device is charging or accepts energy processes is slow and released an energy need the people accumulator is a low charging Rate (low electric power) long interval are required but release an electric energy at a high rate (higher power Release) is the short period.

Battery is Energy storage devices in storage energy is chemical energy, chemical energy is converted into Electrical energy in the flow of electrons is provides electric charge. Chemical Energy is flow in the battery ions form and solution is the electrolyte solutions.

2: Working and Experiment Set-up

2.1 High temperature superconductor materials (HTS)

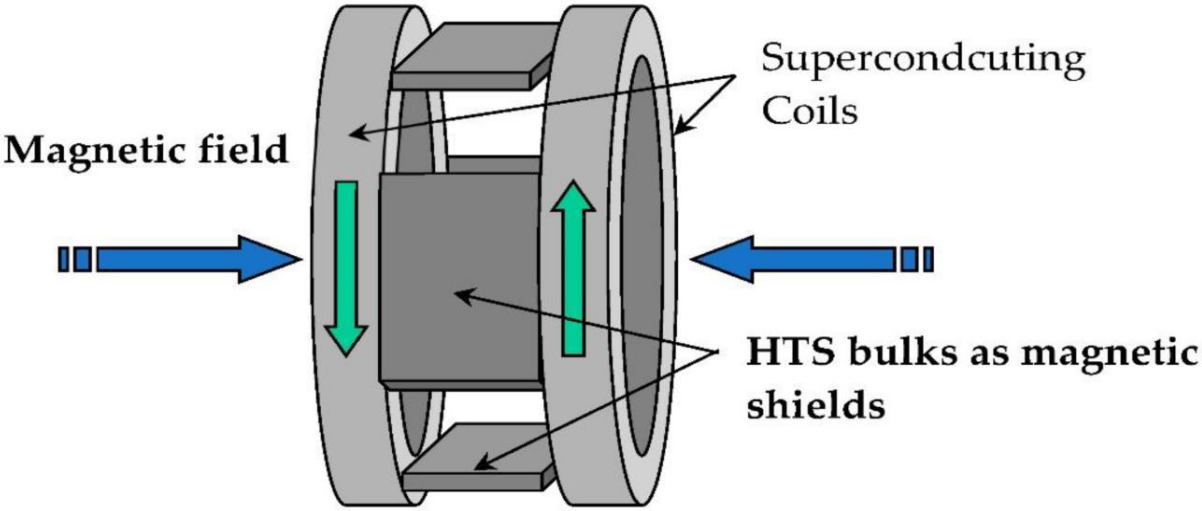

Figure.2.1: Application of the Superconductor materials working

Application of the superconductor materials at stage of the high temperature superconductor materials are working temperature is 77K in this Experiments generating the magnetic field between tow superconducting coils. The distance between tow superconducting coils width of the high temperature superconducting bulks as magnetic shields the superconducting coils are moving.

2.2: low Temperature superconductor material (LTS)

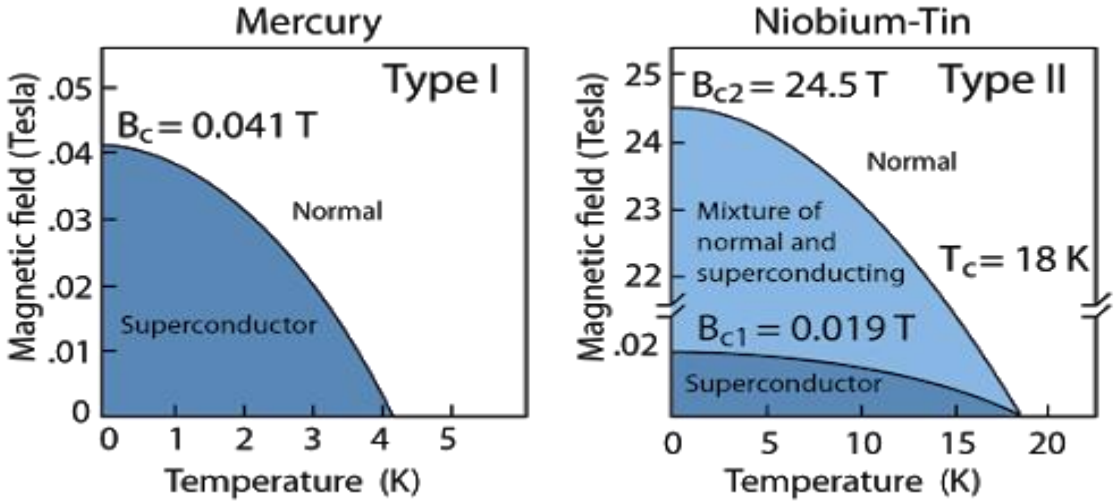

Figure.2.2: Critical Temperature of Superconductor Material

The critical Temperature of the superconductor materials is Tc the graph between Magnetic field and temperature of the superconductor material Mercury is the Normal superconductor material type-I and Niobium-tin is Type-II composite is the superconducting materials. Superconductor materials at the temperature as well as few Kelvin in the critical temperature Tc are the temperature is below which material superconducting Tc = 125K, higher temperature of superconducting Tc = 250K.

3: Results and Discussion

Table.3.1: The Critical temperature of the Superconductor materials (Tc) is pure metals

Superconductor Material Wire	Critical Temper… (Tc) K	Critical Temp…. (Tc) °C	Wires Diameter In (µm)
Tungsten	0.022	-273	35
Thorium	1.40	-273	35
Mercury	4.30	-270	35
Cadmium	0.60	-273	35
Aluminium	1.70	-273	35
Vanadium	5.5	-269	35
Lead	7.4	-267	35

The critical Temperature of the superconductor materials is (Tc) values are presented in the table No. 3.1 of the different materials of the superconductor materials Tungsten, Thorium, Mercury Cadmium Aluminium Vanadium, Lead the critical Temperature of the superconductor materials different- different Different Temperature

Table.3.2: Physical Properties of Superconductor Materials

Superconductor Materials	Density (g/cm^3)	Melting Point °C	Boiling Point °C	Efficiency of Wires (S.C.M)
Tungsten	15.63	2785	6000	99%
Thorium	11.72	1800	4500	97%
Mercury	5.43	-38.8	356.6	95.5%
Cadmium	8.68	321	767	96%
Aluminium	2.68	660	2480	97.5%
Vanadium	6.0	1910	3407	96.8%
Lead	11.34	327	1755	97%

Physical Properties of the superconductor materials density, Melting point, Boiling Point, and Efficiency of the superconductor materials is presented by the table No.3.2

Table.3.3: Mechanical Properties of the superconductor materials conductors' materials

Super conductor Materials Wire	Tensile Strength Yield (N/mm^2)	Tensile Strength Ultimate (N/mm^2)	Elongation Of Break (A %min)	Vickers Scale HV
Tungsten	300- 450	500 - 600	5.00 %	325 Mpa
Thorium	33.3.0MPa	210.0Mpa	40.00 %	298.0 MPa
Mercury	100- 200	400.0	40 - 55 %	176 MPa
Cadmium	450 MPa	510 MPa	30.00 %	251 MPa
Aluminium	80-900 MPa	380 - 1900	45-50 %	215MPa
Vanadium	200-550	550 - 600	30%	300 MPa
Lead	350 - 400	410 - 545	40%	250 Mpa

Mechanical Properties of the superconductor materials is very suitable tensile strength Ultimate and yield strength of the superconductor materials.

Stress and strain properties diagram of the superconductor materials also suitable in the application field in electric power transmission lines and electric circuit and power generation systems.

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5: Conclusion

Superconductor materials are the Electrical Properties are very good and not loss of electric power and time is minimization of the any electronics devices in wiring of superconductor material wire. Electric Resistance is zero of the superconductor materials wires all the electric and electronic devices operating time is reducing and working life is increasing. Efficiency of the superconductor material wire is like (90-100) %

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