NANOPARTICLE BATTERY

[1]Divyansh Dixit, [2]Aman Choudhary, [3]Vidyadhar Biswal, [4]Deepak Kumar, [5]Bhargav Chowdhary

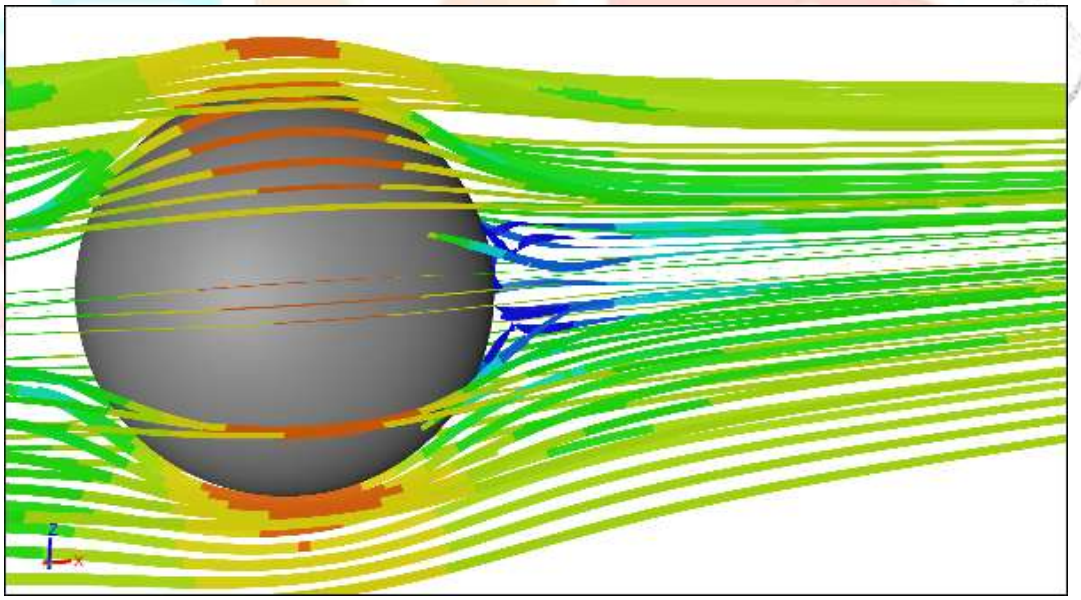
[1,2,4,5]UG student, [3]Assistant Professor
Chandigarh University, Gharuan, Punjab, India

Abstract: **Nowadays technology has various new researches added to it. We have also tried to innovate the existing battery with a new kind of innovation changing the materials used in battery and increasing its efficiency. Thus, enabling the user to have a longer and more efficient battery life than before. We have thought of making a battery that can last long and has a good life and needs far less charging then our existing batteries at present so that the user can have a far more battery life and it doesn't need much charging. The constituents have been changed to increase the battery life.**

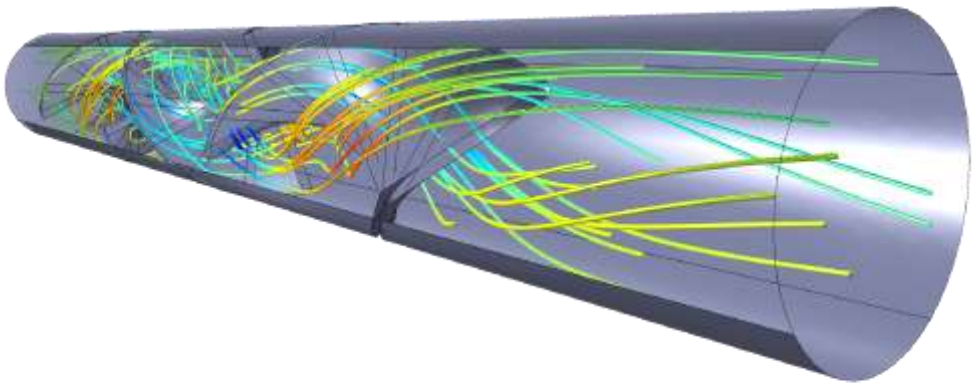
Index Terms **- Nano-particles, material change, efficient, more battery life.**

I. INTRODUCTION

We as a whole have seen lithium batteries and no uncertainty they are the best and productive battery however these days with increment in innovation and headway in battery it's a great opportunity to supplant the lithium batteries. We have proposed to change the constituents of battery and supplanting it with our constituents. We have rolled out an improvement in structure in plan of battery and made it much more viable and productive. We have changed the lithium particle battery with a battery made up of long fiber molded Nano particles. It will make battery more powerful and durable as fiber formed Nano particles have more charge putting away limit and it can assume responsibility and convey charge for a more drawn out timeframe. Not just this we have likewise rolled out improvement in constituents of battery as 85% long fiber formed lithium Nano particles.10%silicon long fiber molded Nano molecule and 5% germanium long fiber molded Nano molecule. We have done as such to expand the effectiveness of battery and to make it significantly more compelling and to make it enduring.



As lithium battery contains particles and most particles are having roundabout shape so if charge courses through them it just is constantly gathered in surface zone not the entire circle. Thus, we have chosen to change the state of battery first so more charge can be amassed on it and it can convey more charge and can make our battery more powerful and with more battery life and more battery time.



In the event that we consider a long fiber formed Nano molecule at that point charge put away in it isn't just in its surface however its spreads to its all part and spread similarly and it is much more viable than round shape and enduring. It will give the client more proficiency and more battery life.

In addition, when we are utilizing 3 distinct materials in a battery it will build its general proficiency and make it more compelling as silicon and germanium are likewise semiconductors and they additionally help in putting away charge and making our battery more successful. It will separate additional time and make the battery more compelling and durable. Utilizing silicon and germanium alongside lithium fiber molded Nano molecule will expand the battery life and make it more viable. As it is obvious from above outcomes that fiber formed Nano molecule can have a more noteworthy charge putting away limit and can store and hold charge for a more drawn out timeframe and it can influence the execution of battery up to a more prominent degree given client more battery life on a similar measure of charging.

Physical Properties

The following table discusses the physical properties of lithium.

Properties	Metric	Imperial
Density	0.530 g/cm^3	0.0191 lb/in^3
Melting point	181°C	358°F
Boiling point	1342 °C	2448°F

Mechanical Properties

The mechanical properties of lithium are tabulated below.

Properties	Metric	Imperial
Tensile strength	≤ 15 MPa	≤ 2180 psi
Hardness, Vickers	≤ 5	≤ 5

Thermal Properties

The thermal properties of lithium are tabulated below.

Properties	Metric	Imperial
Thermal expansion co-efficient (@20-100°C/68-212°F)	56 µm/m°C	31.1 µin/in°F
Thermal conductivity	71.2 W/mK	494 BTU in/hr.ft^2.°F

As we can see the properties of lithium it has good thermal and physical properties that makes it efficient for making a battery and an efficient one. It has good electrical conductivity and can easily be used in making battery.

Electrical Properties

Electrical Properties	
Intrinsic Carrier Concentration	$1x10^{10}$ cm^{-3}
Electron Mobility	≤ 1400 cm^2 V^{-1} s^{-1}
Hole Mobility	≤ 450 cm^2 V^{-1} s^{-1}
Electron Diffusion Coefficient	≤ 36 cm^2 s^{-1}
Hole Diffusion Coefficient	≤ 12 cm^2 s^{-1}
Electrical Resistivity	3-4 μΩ cm @ 0°C

Thermal, Mechanical and Optical Properties

Mechanical Properties	
Melting Point	1414 °C
Density	2.329 g cm^{-3}
Young's Modulus	130-188 GPa
Shear Modulus	51-80 GPa
Bulk Modulus	97.6 GPa
Specific Heat (@ 298 K)	0.75 J g^{-1} K^{-1}

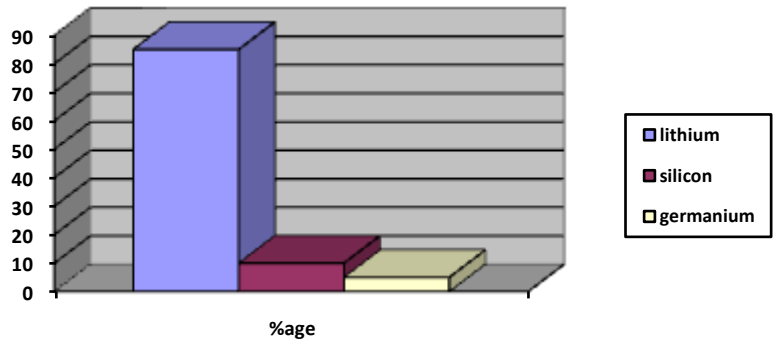
These are the properties of silicon and it is clear from its electrical properties that it can also be used to make battery we are only using 10% of silicon fiber shaped Nano particle to increase the battery life of lithium ion battery. It has low electrical resistance and can be easily used to make our battery.

Electrical Properties

The electrical properties of Germanium are provided in the table below:

Electrical Properties	
Intrinsic Carrier Concentration	2.4 x 10^{13} cm^{-1}
Electron Mobility	≤ 3900 cm^2 V^{-1} s^{-1}
Hole Mobility	≤ 1900 cm^2 V^{-1} s^{-1}
Electron Diffusion Coefficient	≤ 100 cm^2 s^{-1}
Hole Diffusion Coefficient	≤ 50 cm^2 s^{-1}
Electrical Resistivity	46 Ωcm

These are the properties of germanium and we have also used it only5%due to the fact that it has high electrical resistance as compared to silicon and lithium. We have also used it to support our new battery to make it more efficient and effective. This will help our battery to take out more battery life on the current charge and make it long lasting.

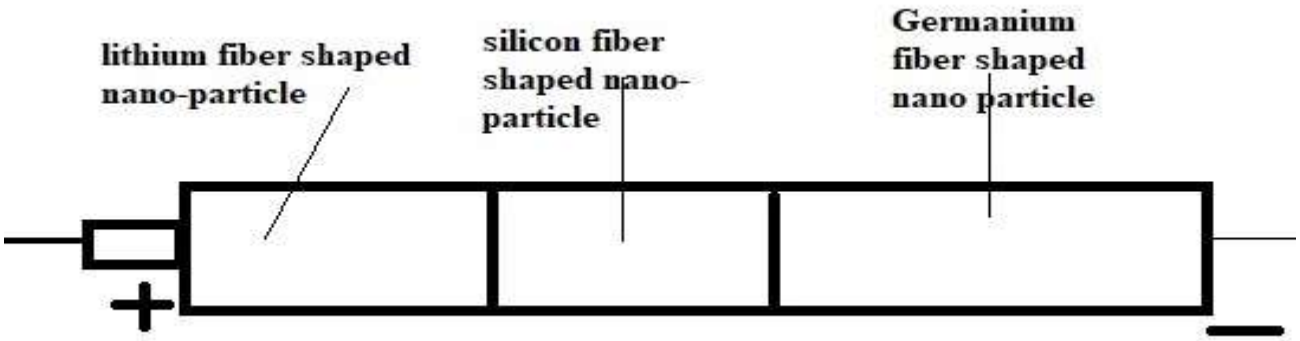


This chart shows the amount of materials used in our battery as lithium is 85% and silicon 10% and germanium 5%. It is done so to make our battery more effective than the previous battery present in the market. It will help to make our battery more effective and efficient.

3.3 Theoretical framework

We are all aware the importance of battery especially phone battery and we all want more from our phone's battery so that we can have more time without charging so we have done a new method of making battery by having long fiber shaped nanoparticle so that we can have more charge retention and more charge carrying capacity and make our battery more productive. Not only this we also we have done material change to support our old lithium shaped batteries by using silicon fiber shaped long Nanoparticle and germanium fiber shaped Nanoparticle to support our battery for extra charge and making it more effective.

IV. RESULTS AND DISCUSSION



This is a basic design of our battery and it is simple structure of battery. Here we are using different materials and making it more simple and effective by using silicon and germanium as materials to increase its efficiency and making it far more effective. It can be used to make a battery that can have more life than regular battery and more effective than all others.

II. ACKNOWLEDGMENT

We would like to thank our university staff for making us understanding the finer aspects of battery and its making so that we could make changes.

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