

Ferrofluid based Electric Power Generator

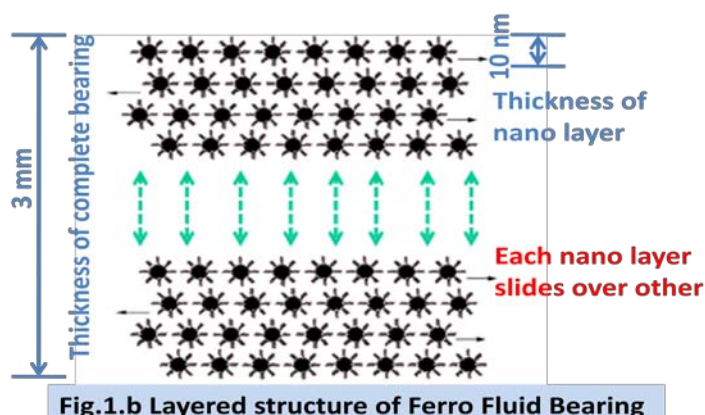
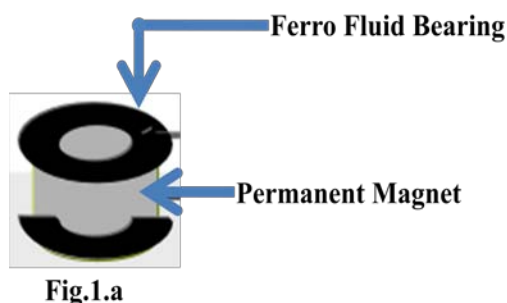
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Abstract—Ferrofluid is a colloidal liquid made up of nano sized (10 -20 nm) ferromagnetic particle which are dispersed in carrier liquids (aqueous or non aqueous medium). These particles stay suspended in solvent and show Brownian motion.

When the fluid comes in contact with permanent magnet the fluid get stick to its poles and forms layer over it. The layer thickness depends on its saturation magnetization of the fluid and the pole strength of magnet. The fluid particles are in the size range of 10-20 nm and usually ferrofluid layer formed on magnet is of size 2-3 mm as shown in fig.1.a.

These individual fluid particles act as tiny magnets and align in the direction of the magnetic line of forces. Thus the 3 mm ring contains around 10^5 nano particles in chain formation. These particles slide one over another and act as liquid bearing as mentioned in fig.1.b.



This layer acts as a lubricant and has very low coefficient of friction. Hence the layer of ferrofluids has been used to make bearing, which is used in generation of electric power by basic principle of Faraday's Law.

A model of such device has been made which runs on wind. The efficiency of device is about 20 % and runs even on a very low wind speed i.e.1.5 m/s. This small portable power generator could be useful in remote areas to charge cell phones or other electronic gadgets in future. The details are described in the paper.