

# What material is used for energy storage inductors

What materials are used in a power inductor?

In a typical power inductor, Litz wire or foil windings made of copper or aluminum materials can be used as winding material to minimize the skin effect. There are many different soft magnetic material options with different magnetic properties as core materials.

What are soft magnetic materials for power inductor?

At present, the soft magnetic materials for power inductor mainly include soft ferrite and soft magnetic metals or alloys (Fig. 1 (c)). The soft magnetic ferrites mainly include Mn-Zn, Ni-Zn, and Ni-Cu-Zn ferrites.

Which type of inductor is best for a power transformer?

Toroidal inductors, characterized by their doughnut-shaped core, offer high inductance with minimal electromagnetic interference. Their compact design and efficient energy transfer make them a preferred choice for power transformers and energy storage applications.

How do power inductors work?

As we know, the power inductors are mainly employed for switching power supply, which can maintain a stable output voltage for power station by controlling switching transistors. They also act as the energy transfer station, transferring the direct current (DC) energy and blocking the high-frequency alternating current (AC).

What are inductor cores made of?

For higher frequencies, inductors are made with cores of ferrite. Ferrite is a ceramic ferrimagnetic material that is nonconductive, so eddy currents cannot flow within it. The formulation of ferrite is  $xx\text{Fe}_2\text{O}_4$  where  $xx$  represents various metals. For inductor cores soft ferrites are used, which have low coercivity and thus low hysteresis losses.

How are inductors made?

The inductors made from these powders are mostly made by the powder metallurgy techniques, followed by winding or molding. The metal or alloy powders are mostly coated by electric insulation layer and bonded by polymer or other materials, and this type of soft magnetic core is also called soft magnetic composite (SMC).



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