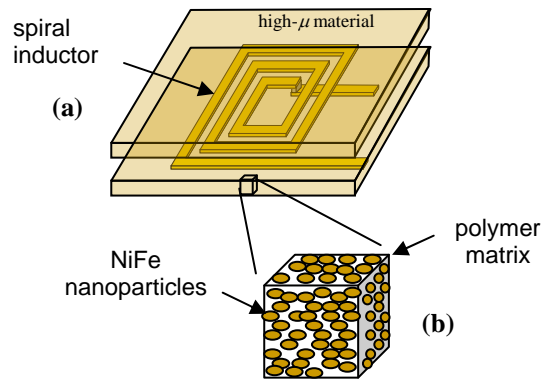


Integrated RF Inductors Using Nano-structured Soft Magnetic Materials

The efficiency of inductors and transforms can be greatly improved by using magnetic materials in the core. It comes as a surprise, then, that magnetic materials are generally not used in inductors and transformers of integrated circuits. This is primarily because suitable magnetic materials, that are compatible with integrated circuits and work well at high frequencies, have not been found.

In this project we are developing new nanostructured metamaterials – combining the properties of two different materials in a nanostructured composite – which will have properties not possible in any known single-phase material. The metamaterial will consist of nanoscale magnetic particles (to give it the desired magnetic properties) embedded in an insulating matrix (to achieve low losses by avoiding eddy currents). These materials will be used to fabricate integrated inductors for high-efficiency, integrated dc-to-dc power converters.



(a) Schematic of a spiral inductor (b) Illustration of the proposed nanostructured magnetic metamaterial .

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