

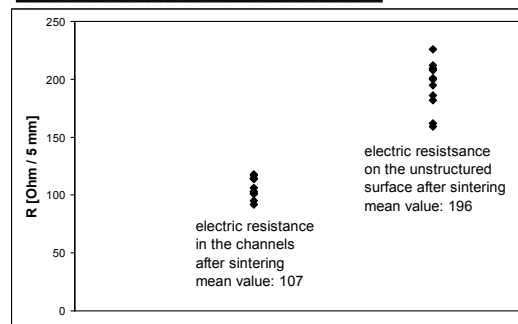
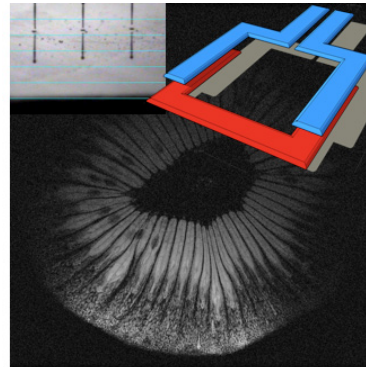
Inkjet Printed MRI Coils and Increased Conductivity Found in Tracks Printed in Embossed Channels

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Abstract

Inkjet printing has been used to successfully produce receiver coils for magnetic resonance imaging. The coils together with incorporated in-line capacitors and external tuning and matching capacitors form a resonance circuit at 400 MHz. The coil and the printed capacitors used the flexible polymer, polyimide as both the dielectric and the substrate. The matching of the coils was measured to be -38 dB. The inkjet printed coils were used to take MRI images, which were found to be comparable to those produced by standard printed circuit board techniques. The left-hand picture that can be seen below shows an image of a kiwi fruit taken using the inkjet printed coil. The scheme shows how the coil was constructed. One part was printed on the lower side of the substrate and two parts were printed on the upper-side. This led to two in series capacitors, which used the polyimide substrate as the dielectric, being formed in the coil. [1]

The second part of the talk will discuss the beneficial effect of hot-embossed substrates on inkjet printed silver tracks. Not only does hot-embossing confer good geometrical control of silver tracks but it has also been found to reduce resistance. A decrease in resistance has been measured for silver tracks that were formed in embossed channels. Comparable tracks that were inkjet printed on untreated substrates are twice as resistive. The graph shown below shows data taken from lines formed on polycarbonate (Bayfol) and in hot-embossed channels that have been formed in the substrate. [2]



References

- [1] D. Mager, A. Peter, L. Del Tin, E. Fischer, P.J. Smith, J. Hennig and J.G. Korvink, "An MRI Receiver Coil Produced by Inkjet Printing Directly on to a Flexible Substrate" Adv. Funct. Mater. submitted
- [2] U. Löffelmann, C.E. Hendriks, P.J. Smith, U.S. Schubert & J.G. Korvink, "Get into the Groove: Silver tracks formed in channels have higher conductivity than their freestanding counterparts" in preparation