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Tuning Metamaterials by using Amorphous Magnetic Microwires
VICTOR LOPEZ-DOMINGUEZ, MIGUEL ANGEL GARCIA, Institute of Applied Magnetism UCM Institute for Ceramica and Glass CSIC, PILAR MARIN, ANTONIO HERNANDO, Institute of Applied Magnetism UCM — Tuning the electromagnetic properties of metamaterials using external stimulus result appealing for both, fundamental and applied reasons. Little work has been developed in the tuning of the properties of a metamaterial by magnetic fields. The main reason relies on the fact that most magnetic materials tale off their response at the microwave band, or they are moderately active only at their Ferromagnetic Resonance, as it is the case of ferrites. These limitations can be overcome using Co-based Magnetic microwires with a quasi-zero magnetostriction that leads to a high permeability at microwave frequencies. The inclusion of magnetic microwires in a metamaterial type Split Ring Resonator array (SRR) allows tuning their electromagnetic properties with low magnetic fields. The results clearly show an effective tune of the S-coefficients up-to 8 dB using 100 microwires per SRR for DC fields between 0 and 20 Oe.

Victor Lopez-Dominguez
CSIC - Madrid

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