**Cork-based composites for microwave absorbing materials**

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Today, the microwave absorbers usually used in anechoic chambers are made from polymer matrix, such as polyurethane or polystyrene, which are produced by the petrochemical industry [1]. These materials are pollutants and their recycling is often very complicated.

In this work, we proposed an original material made from a bio-sourced matrix (cork) [2], acting as a support for the absorbing load (here carbon black). In addition to the rot-proof nature of this matrix and its thermal and acoustic insulation properties, the use of this material was motivated by two other properties: its low density and its fire resistance; two properties necessary for its use in anechoic chamber.

In this work, the dielectric characterization of the materials, with different compositions in carbon black, is presented and revealed very interesting dielectric properties with regard to the intended application: namely a low permittivity associated with high dielectric losses. The simulation of pyramidal absorbers, using measured properties, is done in order to choose the best composition for the achievement of a pyramidal prototype. The measurement of the absorber prototype showed excellent absorption performance for a normal and oblique (30°) incidences of the electromagnetic wave. Very low reflection (Γ <-40 dB) is obtained over a wide frequency range (between 3.5 GHz and 17 GHz). The prototype of Bio-sourced based absorber also showed, for certain frequencies, better absorption performance than those of a commercial absorber with the same geometry.

The temperature and power resistance of these absorbing composites are also studied by simulation and measurement. The results show a much slower rise in the temperature of our material than a commercial absorber one, based on polyurethane foam.

**Key Words: Bio-sourced composite, electromagnetic absorption, carbon particle, anechoic chamber, reflection loss.**

References

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