

Technology Offer CSIC/AF/019

Piezomagnetic ϵ -Fe₂O₃ crystals



New synthesis method to produce ϵ -Fe₂O₃ nanoparticles for magnetic memories or wireless communication devices

Intellectual Property

PCT patent application filed

Stage of Development

Fabrication method validated in laboratory

Intended Collaboration

Licensing and/or co-development

Contact

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Market need

ϵ -Fe₂O₃ presents a large magnetic anisotropy that makes it interesting for technological applications related to magnetic memories and to the development of self-biased non-reciprocal devices which are appealing for the forthcoming generations of wireless communications.

ϵ -Fe₂O₃ should be above 25 nm to retain the magnetization. There are several methods to prepare these nanoparticles, but none of them is scalable, making impossible an industrial application.



CSIC solution

Our new method allows the synthesis of piezomagnetic ϵ -Fe₂O₃ nanoparticles of sizes above 25 nm. The nanoparticles can be used for the manufacturing of magnetic memories or wireless communication devices as self-biased non-reciprocal devices, such as miniaturized circulators for high-frequency (above 100 GHz) wireless communications.

Competitive advantages

- Easily scalable and sustainable synthesis.
- Piezomagnetic property of ϵ -Fe₂O₃ makes it possible to obtain magnetized parts by sintering the material under uniaxial pressure.
- Magnetized nanoparticles can be used in planar microstrips circulators.