

FeCo ELECTRICALLY INSULATED NANOPOWDERS

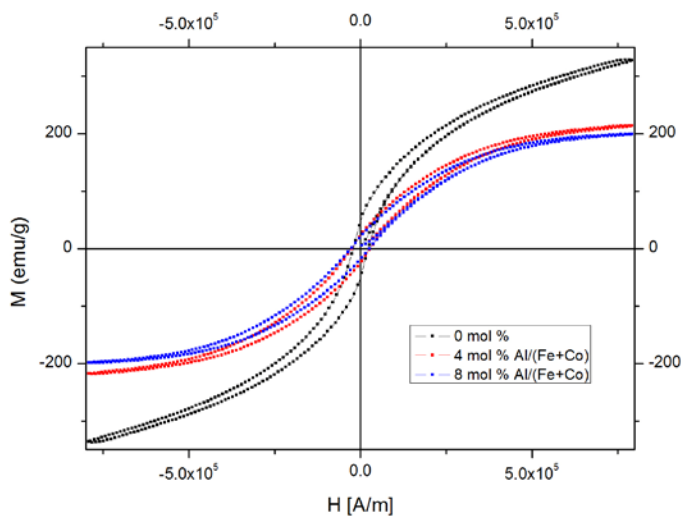
INC DIE ICPE-CA can manufacture soft magnetic materials, based on FeCo/Al₂O₃ core-shell nanoparticles, prepared by chemical synthesis techniques.

| Physical characteristics | Fe _{0.25} Co _{0.75} /Al ₂ O ₃ | FeCo/Al ₂ O ₃ |
|---|---|-------------------------------------|
| Specific saturation magnetisation, M _s (emu/g) | 100 – 165.5 | 190 - 213 |
| Coercivity, H _c (kA/m) | 14.35 | 14.35 |
| Resistivity of sintered materials, ρ (Ω·m) | order of 10 ¹⁴ | |



FeCo/Al₂O₃ electrically insulated nanopowders

Advantages: ▲ increasing saturation magnetization, due to the FeCo nanoparticles; ▲ improving electrical resistivity, due to the presence of Al₂O₃; ▲ decreasing magnetic losses; ▲ improving mechanical strength for the bulk sized components, compared to the currently available Fe-Si alloys, used as metallic punched sheets for the building of the magnetic cores.



Hysteresis loops of FeCo/Al₂O₃ nanopowders with different Al/Fe+Co molar ratios



Rings, rotor core and 4 rotor cores stack, made from FeCo electrically insulated nanopowders

Applications:

Besides the use of these novel materials as key materials for manufacturing rotors in rotating electrical machines, new opportunities may arise for commercial applications: power converters, microwave antennas or rectennas, high frequencies electronic parts made by ferrites, such as inductors, chokes, sensors, core-shape transformers, ultrahigh radio frequency telecommunications, planar transformers, hybrid circuits and computers.