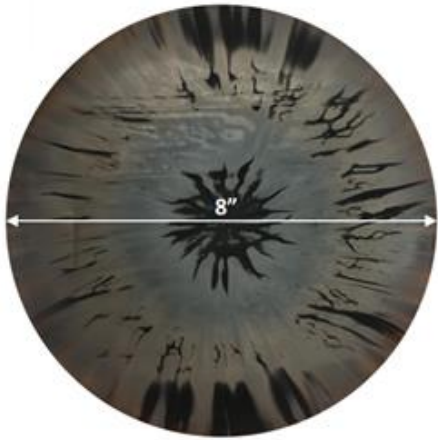


Materials Development for Affordable Maritime Compatible RF Materials

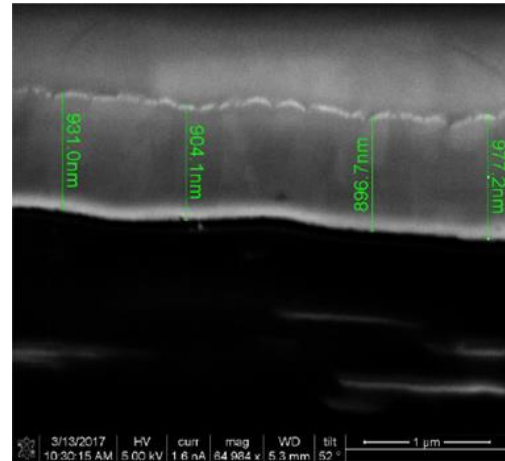
Bioenno Tech has designed a novel class of ferrite based magneto dielectric materials (MDMs) that can be used to manufacture miniaturized radio frequency (RF) devices, providing a large factor of miniaturization as a result of the combination of both high permittivity (ϵ) and high permeability (μ). This development is expected to transfer into a commercially viable low-cost technique for high volume manufacturing of maritime RF devices/circuits integrated on large scale printed circuit boards (PCB) for high functionality radar and radio phased antenna arrays.

Development Progress

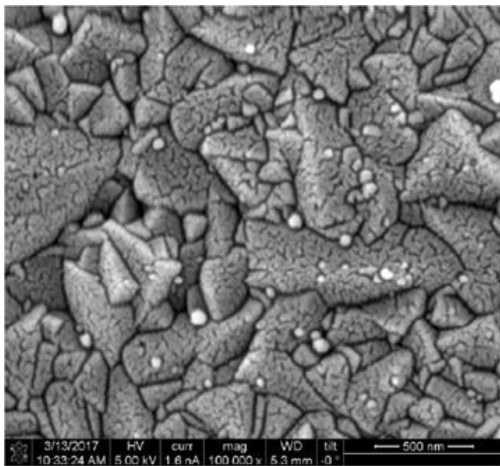
Here at Bioenno Tech, development of spin-spray deposition and co-precipitation processing techniques has established a solid technical foundation upon which the MDMs can be refined to meet the increasing demands of future requirements. Preliminary spin-spray deposition synthesis of large thin film samples, 8-12 inches in diameter, has been carried out. The studied material properties and nanocrystalline structure indicate that this method is capable of fabricating functional RF circuits on flexible substrates such as copper or polyimide. Co-precipitation development has produced MDMs of various non-layered/layered compositions in nanopowder forms with tunable magnetic properties. MDMs in nanopowder form allow for processing into large dimensional sheets of coatings or complex 3D printed designs. The development and research carried out by Bioenno Tech has readied a novel class of magneto dielectric materials for effective integration into the technologically-advancing world.



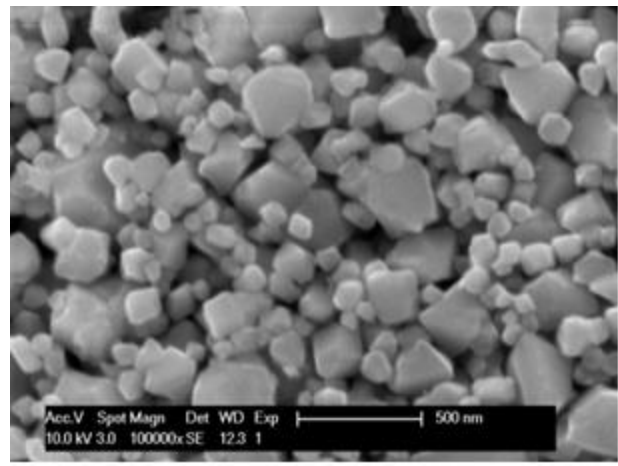
(a)



(b)



(c)



(d)

- (a) Photo image of spin-sprayed ferrite film sample
(b) SEM image (side) of ferrite film processed with spin-spray deposition
(c) SEM image (top) of ferrite film processed with spin-spray deposition
(d) SEM image of ferrite nanoparticles synthesized through co-precipitation