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Thin Film Ferrite Lamination Method

Ferrite is a common term that can include many different oxides that are built in the spinel cubic crystal structure. There are many different types of spinel ferrites and all can be deposited onto plastic or glass substrates to form thin film ferrite laminates. Various methods have been developed to deposit the ferrite, including spin-spray plating, chemical solution deposition (CSD), chemical vapor deposition (CVD), and other similar deposition methods. Thin film ferrites are useful because they exhibit a wide array of properties including high complex permeabilities, relatively high resistivity, low losses, and high resonance frequencies. However conventional methods face many challenges in creating ferrite laminates, ranging from high coercivity to low saturation magnetization to high temperature substrate heating.

Researchers at Arizona State University have developed a new process for creating thin film ferrites that addresses the challenges of thin film science. One of the most difficult challenges in conventional methods is growing a dense and well adherent ceramic oxide film, produced at high temperatures, onto a plastic substrate at low temperatures. The method developed by Arizona State University researchers addresses these challenges by introducing a simple method that utilizes low temperature thin film deposition onto a plastic substrate using spin spray plating and layering it to develop a 3D structure. This method results in a laminate high in saturation magnetization, low in coercivity, and with the ability to form the laminate into the desired shape and thickness.

Potential Applications

- Electromagnetic Noise Suppression
- Global Positioning System (GPS)
- Synthetic Aperture Radar (SAR)
- Semiconductors
- Microstrip Antennas
- Magnetic Sensors
- Telecommunication
- Inductors

Benefits and Advantages

- Low temperature process (<350° C)
- Very good adhesionLow water absorption
- No use of bulk ferrite or mylar shims
- Cost effective and beneficial in large scale production

