

Magnetic characterization of Fe nano-sized powder synthesized by pulsed wire evaporation method

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Recently, soft magnetic metal powder composite have been used for chip power inductors for high frequency applications due to their ability to prevent eddy current loss and higher saturation magnetization than ferrite. Fe based amorphous powder that possesses good magnetic properties and low core loss is a favorite element for the chip power inductor. However, the amorphous powder has a lower saturation magnetization (M_s) as compared to crystalline Fe powders and also shows a high core loss at the high frequency range. In order to achieve high performance (i.e. having high M_s and low core loss) when operated at a wide frequency range above 1 MHz, Fe based nano-sized particles with an insulating shell layer has been intensively investigated [1]. To prepare the Fe nano-sized core-shell particles with specific functional properties, many synthesis techniques have been attempted [2, 3]. The pulsed wire evaporation (PWE) is known as a one-step synthetic technique with high efficiency as compared with other methods involving several treatment steps [2]. In this work, we characterized the microstructure and magnetic properties of Fe/Fe₃O₄ nano-sized core-shell powder prepared by the PWE method.

References

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