

Fabrication of iron phosphate-coated Fe alloy powder

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Soft magnetic composites (SMC) are used for various AC and DC electromagnetic applications such as electromagnetic circuits, sensors, electromagnetic actuation devices, low frequency filters, induction field coils, magnetic seal systems and magnetic field shielding. Soft magnetic powder particles are normally coated by insulating oxides before sintering to minimize the eddy current loss consisting of the core loss. For this purpose, we tried to fabricate coated ferromagnetic metal powder composed of a core particle of Fe alloy and a shell layer of iron phosphate. The iron phosphate coating was performed by a phosphating method with two types of solvents, acetone and water. We controlled the condition of the iron phosphate coating, such as temperature and phosphate concentration, in order to uniform and thin (<100nm) coating layer. Details will be presented for a discussion.