

Effect of Spray Drying and Reduction Conditions on the Magnetic Properties of Nd₂Fe₁₄B Particles

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We have fabricated Nd₂Fe₁₄B magnetic particles via spray drying, followed by reduction-diffusion. Spray drying is widely used to produce nearly spherical particles that are relatively homogeneous. The precursor particles were prepared by varying spray drying conditions such as concentration of the aqueous solution containing Nd salts, Fe salts and boric acid with the target stoichiometric composition of Nd₂Fe₁₄B. Thus, the sizes of the spray-dried particles are in the range from sub-micrometers to several tens of micrometer, which adjusted by controlling the concentration of precursor solution. The obtained precursor particles were subjected to subsequent treatments including hydrogen reduction, calcium reduction and washing. The effect of spray drying and reduction conditions on the formation of Nd₂Fe₁₄B phase and magnetic properties were investigated.