

# Influence of average particle size on remanence and degree of alignment of sintered strontium ferrite magnets

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## **Abstract:**

Strontium ferrite magnets are constantly studied with the aim of increasing its magnetic properties due to its characteristics such as appropriateness at higher frequency, lower price, greater heat resistance and higher corrosion resistance. The goal of this work was to investigate the effect of strontium ferrite magnets sintered with powders with different average particle size on magnetic properties in order to increase these values. Strontium ferrite powders were milled in a planetary ball mill varying the time from 30 minutes to 6 hours. The average particle size was determined using Fisher subsieve sizer (1.3  $\mu\text{m}$ ). The powders were aligned to a 6 T magnetic field, isostatically pressed and sintered in a tubular furnace at 1220°C during 25 minutes. After this process, it was calculated the magnets density (around 90% of theoretical density) and magnetic properties were determined ( $B_r = 3.11$  kG). The alignment index was determined ( $\cos \theta = 0.84$ ), once it is strictly related to remanence ( $B_r$ ), based on data from the relative diffracted intensities of the strontium ferrite phase planes on the X-ray diffraction pattern of anisotropic and isotropic magnets showing that the degree of alignment varied by changing the milling time. For the microstructure observation SEM was used to visualize grain size distribution.