9.7 cm

Effect of various heating conditions on magnetic and mechanical properties of a finemet alloy

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Magnetic properties and structure development of a finemet alloy under various heating conditions were investigated. We developed a product which has extremely large permeability, and which is insensitive to the temperature and mechanical conditions during application. Heating rates and the applied maximum temperature was changed during sample preparation. Recystallization took place within a narrow temperature interval from 773 to 793 K, and the residual amorphous fraction was about 30%. The final state depends on the maximum temperature of preparation, but is not very sensitive to the heating rate. The maximum permeability was about 100.000 at 10 kHz, 760.000 at 50 Hz and over 1.500.000 in DC measurements! We could prepare samples for which the magnetic properties were quite stable against of the variations of the temperature and mechanical conditions. For the mechanically most stable samples we got also very good 50 Hz permeability although it was only about 360.000. Furthermore, the annealing temperature necessary to get the maximum permeability at 10 kHz, coincides with the temperature required to reach the mechanically most stable samples. These good magnetic and mechanical properties are the most excellent results published for these type of materials at present.

13.4 cm

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