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MAGNETIC AND STRUCTURAL PROPERTIES OF AMORPHOUS ALLOYS AND
APPLICATIONS

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Iron-rich metallic glasses are potential candidates for a variety of electromagnetic applications. It has been found that for some situations the completely amorphous state is not always advantageous, and partial crystallization may lead to improved or even novel properties.

Surface crystallization in amorphous alloys with positive magnetostriction produces a perpendicular magnetic anisotropy (1), with consequent improvement of some macroscopic properties. Here it is shown a little review on the influence of partial crystallization on magnetic properties of iron-rich amorphous alloys (2), with particular emphasis on power losses.

We studied an amorphous alloy with composition $\text{Fe}_{78}\text{B}_{14}\text{Si}_8$ and the development of a crystalline phase has been checked by means of different techniques. The effect of thermal treatments on power losses has been determined (3).

Isothermal measurements of the power losses show a minimum displaced towards low times at high annealing temperatures. An increasing on the crystallization process produces an increase of the power losses and, in general, a deterioration of the soft

magnetic properties of the sample. A correlation can be observed between power losses and crystalline fraction ; the cristalline fraction is obtained through X-ray diffraction measurement.

The effect of partial crystallization in the amorphous matrix on the power losses is discussed in terms of the current models.

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