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Magnetic Properties of Amorphous Fe-B-Si Alloy with Surface Films

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Synopsis :
Surface coatings on Fe79.5B12Si8.5 (mol%) amorphous alloy ribbons have been studied to obtain high insulating resistance and high corrosion resistance. (1) A surface coating of lithium silicate with a molecular ratio SiO2/Li2O=3.5 has been found to induce

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Surface coatings on $Fe_{79.5}B_{12}Si_{8.5}$ (mol %) amorphous alloy ribbons have been studied to obtain high insulating resistance and high corrosion resistance. (1) A surface coating of lithium silicate with a molecular ratio $SiO_2/Li_2O = 3.5$ has been found to induce compressive stress in

field ordinarily at a temperature of 623 to 673 K and then used as a transformer iron core. Therefore, a surface film of the organic resin type cannot be used because it will lose electric insulation by a chemical reaction during annealing at high temperatures. Thus the present study has been carried out aiming at an inorganic type surface film, and it has been found that

while the weight was added through thin sheets, which were fixed to both ends of the sample in the lengthwise direction on the outside of the magnetic circuit using adhesive tape.

2.3 Thin-Film X-Ray Diffraction

To identify the surface crystalline phase, thin film X-

ties caused by the above mentioned LSS 35 film. B_r and

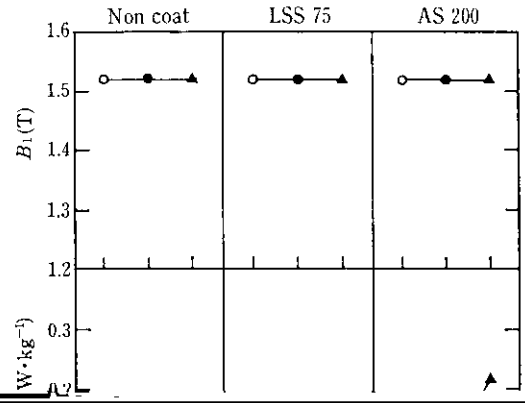
3.1 Surface Film That Gives Compressive Stress

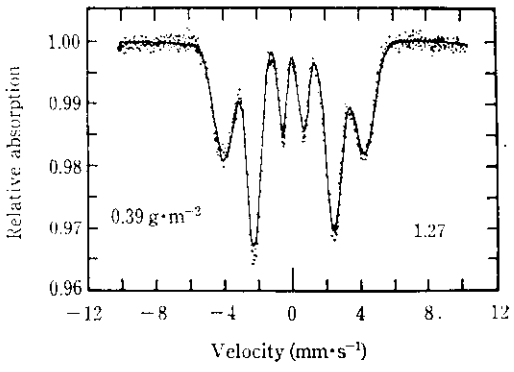
stress to an as-bared amorphous $Fe_{79.5}B_{12}Si_{8.5}$ alloy ribbon after ananealing in a magnetic field and to another

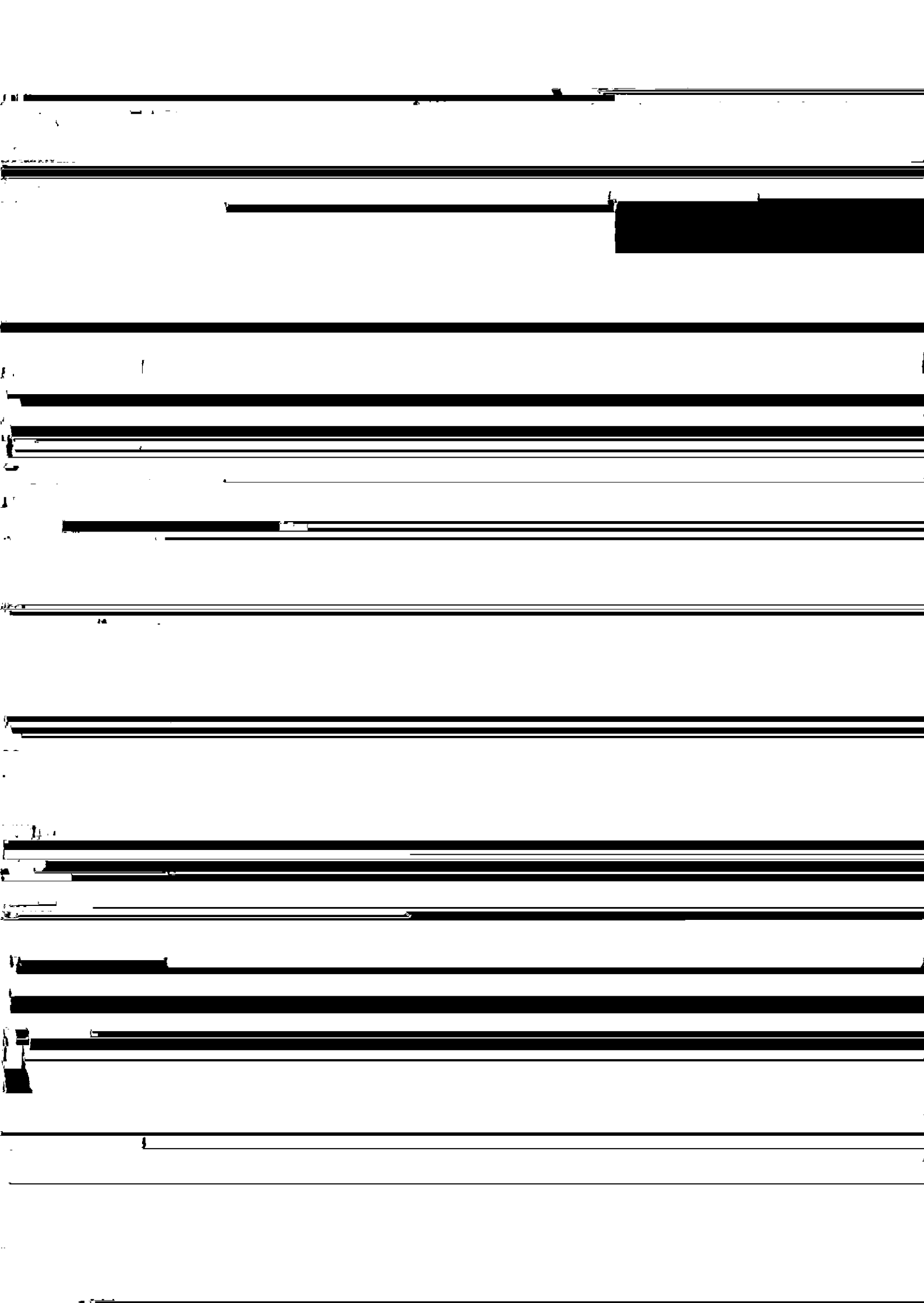
As a typical example of a surface film that can give compressive stress to the amorphous Fe-B-Si alloy ribbon with an LSS 35 surface film of 2.6 g/m^2. The result is shown in **Fig. 2**. The amorphous alloy ribbon

face.[11,12] This development of constant permeability bon surface. This has caused a development of magnetic

which was generated inside the amorphous alloy ribbon LSS 35 surface film shown above.


Non coat
LSS 75
AS 200
1.6
1.5
1.4
1.3
1.2
B_1(T)
0.3
W·kg^{-1}


1.00
0.99
0.98
0.97
0.96
Relative absorption
0.39 g·m^{-2}
1.27
−12
−8
−4
0
4
8
12
Velocity (mm·s^{-1})



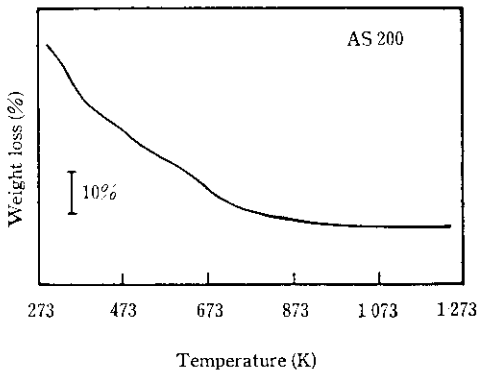
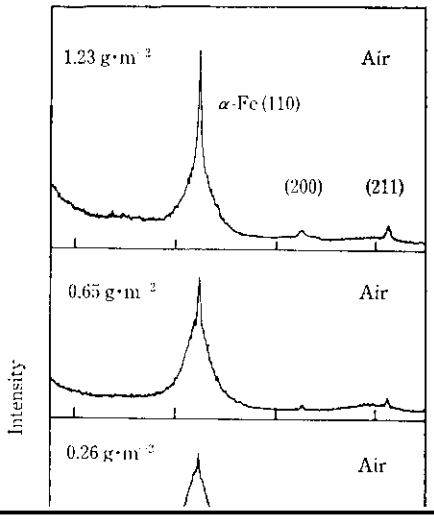


Fig. 8 Thermogravimetric analysis curve of AS 200 dried at room temperature



the ribbon, and thus has no direct effect on the

3.4 Surface Film Suitable for Amorphous Alloy

face crystallization, regardless of annealing atmosphere and therefore will have hardly any effects on

The basic composition of the amorphous alloy used for iron cores of power transformers will be limited to the Fe-B-Si system due to factors such as saturation

Thus Lithium Silicate 75 is a surface film suitable as a amorphous alloy for transformer use.

(3) The surface film of Alumina Sol 200 has no mecha-