

Memorandum 6M-4064

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SUBJECT: REMARKS ON DOMAIN PATTERNS RECENTLY FOUND IN BiMn AND
SiFe ALLOYS
To: Group 63, Staff
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Approved: DRB
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Abstract: It is shown that in a demagnetized crystal in which closure-domains do not form, the domain pattern on a surface perpendicular to the easy-magnetization axis varies with the thickness of the crystal. For thin crystals the domain configuration should consist of plane-parallel walls. As the thickness of the crystal is increased, the plane walls become undular to form a rickrack-type pattern, the amplitude of the waves increasing with increasing thickness. At greater thicknesses the domain pattern becomes more complicated, a characteristic feature being many small domains of reverse magnetization penetrating as spikes from the surface into the interior. A typical pattern for a demagnetized sample could consist of a regular pattern of reverse-domain spikes within large domains demarked by plane-parallel walls extending all the way through the crystal. These theoretical predictions are compared with domain patterns recently observed in BiMn alloys and in Barium Ferrite. Recently reported domain patterns in polycrystalline SiFe alloys are interpreted as representing the latter configuration. The significance of the patterns found in SiFe alloys for the theory of flux reversal is also discussed.


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Note: This report has been submitted as an article for the Physical Rev. Copies may be obtained from Mrs. Muriel Durso, B-181.

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