which returns them to regions of the photographic emulsion corresponding to masses higher than those of the main isotopes.

If, however, ions lose their charges more rapidly during passage through the emulsion, fewer of them are reflected. Swift[2] confirmed this view experimentally.

Mai[3] has shown that if the photographic plate is cut into parts in such a way that the ions of the main component do not strike the emulsion at all, no halo is produced.

All these precautions are fairly complicated. An easy and simple method of eliminating halation consists of painting a small conducting strip on the spot at which the main isotope line(s) will appear. This can easily be done in the dark room before the plate is placed in its hold using a rule and a small brush. This painted strip can be earthed by applying a second strip at the bottom of the plate so as to make contact with one of the pins on which the plate rests. If the strip is not earthed the effect is very poor.

The paint consists of a mixture of 300 mg graphite powder, 100 mg cellulose nitrate and polyvinyl acetate, and 180 mg ethyl acetate. After drying, the layer has a thickness of about 0·1 mm. Graphite has been chosen because of its low mass, which gives greater depth of penetration[4] and more chance of the ions losing their charge.

Figs. 1 A and B show Joyce Loebl densitometer recordings without and with the use of the strip of graphite paint mentioned above. This strip has a width of 4 mm on the plate. The mass spectrogram (obtained with an A.E.I. M.S.7 instrument) is of gallium with arsenic present as an impurity.

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THE SOLID STATE

Fast Domain Wall Motion in Double Nickel–Iron Films

RECENTLY, Humphrey and Clow[1] found that flux reversal in multilayer films[2], consisting of 200 Å thick nickel–iron films interleaved with silicon monoxide layers each about 100 Å thick, was much faster than that observed in normal single films. A possible explanation for this fast flux reversal might be that domain wall motion is much faster in multilayer than in single films. To verify this assumption, Patton and Humphrey[3] have measured wall velocities in double films. For small driving fields, the wall velocity obeys the relation

$$V = m(H - H_c)$$

in which H is the applied field, H_c the wall motion coercive force and m the so-called wall mobility. Patton and Humphrey found that—contrary to expectation—the wall mobilities in double and in single films were about the same.

This communication reports the results of wall velocity measurements in double nickel–iron films (81/19) which show that wall mobilities in double films are much larger than those measured in single nickel–iron films. The measuring technique used has already been described[4] and is similar to that used by Patton and Humphrey[3].
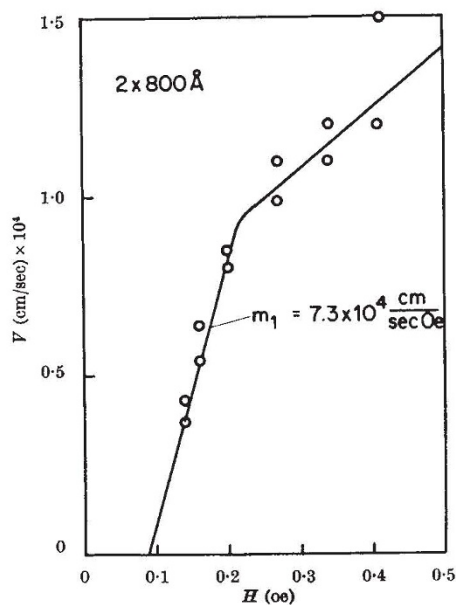

Fig. 1.

Fig. 1 shows the wall velocity measured in a double film (2 × 800 Å nickel-iron, 100 Å SiO, $H_c = 0.09$ oe, $H_k = 5.4$ oe) as a function of the applied field. The wall mobility as obtained from the straight line relationship for small driving fields is 7.3×10^4 cm/sec oe, which is much larger than that measured both in 800 Å and in 1600 Å single nickel–iron films. It is interesting to note that in double films the wall mobility decreases for higher fields, just as is observed in single films[4].

Table 1

D (Å)	Single films m_1 (10⁴ cm/sec oe)	Double films $D_{SiO} = 100$ Å D (Å)	m_1 (10⁴ cm/sec oe)
90[1]	1·39	2 × 135[6]	9·1
260[2]	0·91	2 × 210[7]	5·4
450[3]	0·29	2 × 440[8]	4·1
880[4]	0·71	2 × 870[9]	7·3
1,650[5]	0·96		

Table 2

Film	H_c (oe)	$H_k{}^*$ (oe)
1	1·3	5·0
2	1·9	5·0
3	1·5	4·2
4	3·0	7·0
5	1·8	7·4
6	0·52	4·8
7	0·48	5·0
8	0·43	5·4
9	0·09	5·4

* Anisotropy field.

In Table 1, wall mobilities measured in double and in single films are compared; Table 2 gives the H_c and H_k values of the films. That walls in double films move much faster than those in single films can easily be observed, which is clearly in contradiction to the results of Patton and Humphrey.

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