specific conductivity of $2 \cdot 2 \times 10^{-3}$ ohm^{-1} cm^{-1}. This sample showed marked grooving along the grain boundaries as well as a high density of large hillocks (marked *A*). The background, in common with germanium, is a mixture of fine etch pits and hillocks.

We have further established that hillocks appear when aluminium, silver, nickel and molybdenum are thermally etched with laser radiation. Apart from the iron which has a purity of 99·98 per cent, the other materials used in this investigation are spectroscopically pure.

The correspondence of etch hillocks and crystal substructure is still being investigated. Fig. 2*a* is an example of a possible dislocation pile-up in a 20 atomic per cent zinc α-brass crystal. A number of such features have been observed in this alloy. The hillocks in these clusters are usually of the same radial size. We have also observed a number of very large hillocks ; these are usually isolated, although centred on a common slip line with small hillocks. Fig. 2*b* shows the characteristic appearance of two such hillocks. Note the rim structure at *C*. These large hillocks are similar in appearance to those observed in copper (Fig. 1*a*).

The development of etch hillocks, as described here, might be a result of the unusual method used to produce the thermal etching. The method appears to have many general applications ; for example, as laser radiation can be focused through a window, the thermal etching of a metal surface which is both under high vacuum and at a low ambient temperature is now possible.

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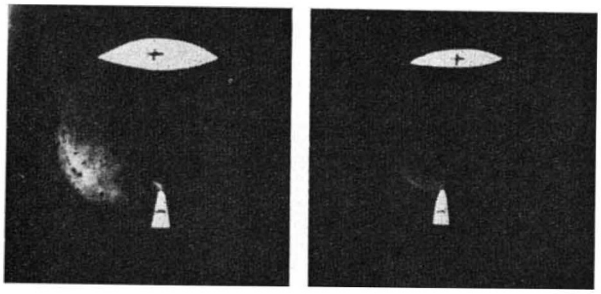
Light Emission in *n*-Hexane under High Electric Stress

Light emission, resulting from the application of high d.c. fields, has been reported for insulating liquids containing fluorescent materials in solution[1,2], and for *n*-hexane by us[3]. Further, a change of refractive index has been observed between electrodes in hexane when a voltage pulse was applied across them[4].

All indications are that the phenomena commence at the cathode, and it is the purpose of this communication to report some further observations on the form of the light emission from the cathode in *n*-hexane resulting from the application of high d.c. fields.

The test cell, electrode systems and cleaning techniques were similar to those adopted by Kao and Calderwood[5] but the *n*-hexane was used as supplied without further treatment. The cathode was a steel gramophone needle having a point radius approximately 0·02 mm and the anode was a stainless steel sphere of 0·25-in. diameter. The background to the electrodes could be illuminated with a pre-focus lamp of adjustable intensity directed through the electrode gap in the test cell towards the lens which focused on the image intensifier which has been described[6]. The output screen of the image intensifier was observed visually and also photographed with a 'Polaroid' camera.

Fig. 1 shows two typical examples of weak light-emission observed at 24·5 kV and 30 kV with a gap length of 1·75 mm. The bright ring* was clearly visible on the screen although it only lasted for a short time: it originated from the tip of the point cathode. This phenomenon can be repeated experimentally. The outlines of the electrodes have been superimposed on the photographs for clarity.



a *b*

Fig. 1. Light emission in *n*-hexane under high electric stress. Gap length = 1·75 mm. (*a*) Applied voltage; 24·5 kV; (*b*) applied voltage; 30 kV

It would be reasonable to assume that a copious supply of electrons is available at the point cathode for the fields under investigation. The electrons may gain energy, excite molecules and form ions with subsequent light emission from the plasma region.

Initially the region of plasma is very small and the electric field at its front boundary is very large. As the plasma grows, this field tends to decrease since the plasma acts as an electrode of increasing effective radius: however, the field eventually begins to increase due to the decreasing effective gap length. Assuming that this explanation holds, the photographs obtained by us could be interpreted as being photographs of the plasma region. Since breakdown did not follow immediately on the event photographed, it must be assumed that the electric field at the front of the plasma had dropped to such a value that it was insufficient to propagate the plasma.

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* Clarity has been lost in Fig. 1*b*, and image intensifier background enhanced in Fig. 1*a* left.

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CHEMISTRY

Boron Carbide, a New Substrate for Fuel Cell Electrocatalysts

A number of investigators have reported high-performance, direct hydrocarbon fuel cells[1–4]. In every case, the direct hydrocarbon anode has used a large amount of high-area platinum black or Raney platinum in the range of about 10–100 mg/cm^2 of geometric electrode area. This tends to counteract the advantage of being able to operate on inexpensive hydrocarbon fuels. Furthermore, there is a tendency for performance to be proportional to