the "forbidden" barrier and exist in the nuclei of subatomic particles.

Note added in proof. The value for the tamaid mass develcped in this paper refers to the bound state, there being insufficient data to assess the binding energy. Should this particle ever be detected experimentally, serious consideration would have to be given to its possible occurrence in the core structure of the muons (4 tamaids) and the π mesons (5 tamaids).

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Growth of Single Crystals of Silver Iodide in Silica Gel

The great solubility of silver iodide in concentrated potassium iodide solution and the rapid decrease of this solubility on dilution with water suggested that single crystals of silver iodide could be grown by a gel method[1] similar to that used for growing crystals of cuprous chloride[2]. Indeed, small silver iodide single crystals have been grown from solution by a dilution method. They appear as hexagonal prisms up to 20 mm in length and 2 mm in diameter or hexagonal pyramids up to 3 mm long and 1·5 mm across the base and take about 6–8 weeks to reach this size[3]. It seemed plausible that a combination of the two methods would yield larger and better crystals.

Gels were prepared from 7 ml. sodium silicate solution (244 g $Na_2SiO_3 \cdot 9H_2O + 500$ ml. water), 8 ml. 2 M potassium iodide and 15 ml. 2 M acetic acid. The gelling mixture was allowed to set in a 25 × 200 mm test tube at 45° C, and a solution made from 57 g silver iodide, 260 g potassium iodide and 250 ml. water was added carefully when the gel had set. This solution was allowed to diffuse into the gel for about a week, poured off and replaced by water. The temperature was kept at 45° C throughout the experiment. Hexagonal plates appeared within a few hours and grew to about 5 mm diameter. One side of these crystals was smooth, the other showed ridges along the diagonals between corners of the hexagon and along lines parallel to the sides of the hexagon, suggesting that growth occurs along only one direction of the *c*-axis.

Electron microprobe analysis confirmed the crystals to be silver iodide. No contaminating silicon from the gel was found (to an accuracy of a few p.p.m.), but potassium was found in quantities up to 6 per cent in certain regions of the crystals, chiefly along the valleys between the ridges.

Smaller hexagonal plates (about 3 mm) were obtained by a slightly different and shorter procedure. Gels were prepared as described, except that potassium iodide solution weaker than 2 M, or water, was used in making the gelling mixture. When the gel had set, addition of the silver iodide–potassium iodide solution resulted in the growth of these smaller crystals in the gel within a week.

A similar set of experiments at room temperature (about 23° C) gave different results. The gels were again made with water instead of potassium iodide solution. Crystals grew in the aqueous layer above the gel as well as in the gel. The crystals in the gel appeared as completely clear small pyramids and prisms (about 0·05 mm). The crystals in the aqueous layer were hexagonal pyramids, 5 mm in diameter and 5 mm high. They had good surfaces, but were translucent rather than transparent.

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THE SOLID STATE

Growth of Sapphire Filaments from the Melt

We wish to report the growth of continuous sapphire (α-Al_2O_3) filaments from the melt with diameters in the range 0·05–0·50 mm, at rates up to 150 mm/min. The growth process almost certainly takes place (at the tip of the advancing filament) below, rather than above, the melt surface. There is an obvious similarity between the process described here and the dendritic growth of germanium and silicon previously described by various authors[1].

Crystal growth experiments were conducted in an apparatus similar to a Czochralski crystal puller, using RF coupled to a carbon susceptor to heat the melt in a molybdenum crucible. It has been reported[2] that sapphire crystals grown from molybdenum crucibles have a slight grey cast but do not contain significant amounts of molybdenum. Our experience is somewhat similar, though the grown crystals show no visible departure from transparency.

Fig. 1 shows an almost classical dendrite produced by allowing a melt of aluminium oxide to solidify onto a mass of solid aluminium oxide immersed in it. Dendrites were observed to propagate rapidly along the surface of the melt when the RF power was switched off. Careful X-ray examination of dendrites, such as the one shown,

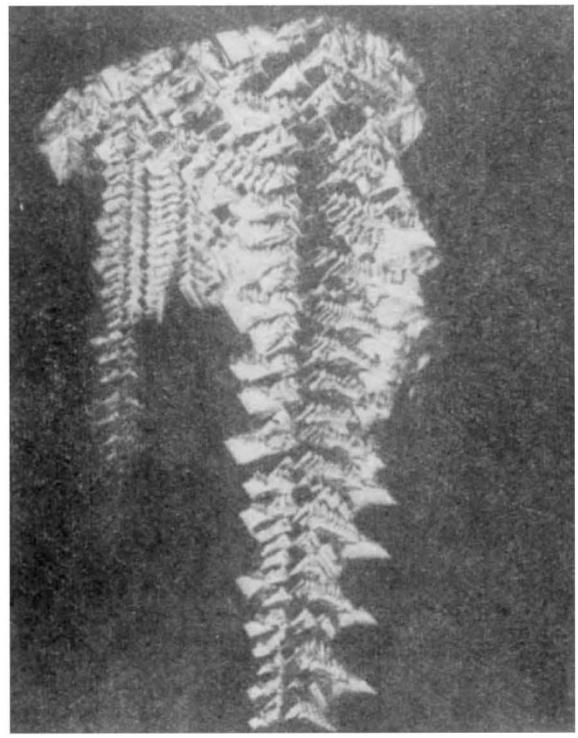

Fig. 1. Sapphire dendrite which grew in the *c*-direction (× 40).