SHORT COMMUNICATIONS

NON-FACETED GROWTH ISLANDS ON SOLUTION-GROWN ANTHRACENE CRYSTALS

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ANTHRACENE, one of the organic semiconductors, enjoys the attention of crystal growers. The present report contains information on the growth features on the (001) faces of solution grown anthracene crystals.

Anthracene and toluene, with a stated purity of 99%, were employed without further purification. Crystallization of anthracene was achieved by slow evaporation of solvent at room temperature. During the final stages of crystallization, the temperature was lowered by 5°C and maintained at the lowered temperature with the help of a water circulation type thermostat. Optical-microscopic examination revealed the occurrence of wide, platy hexagonal crystals. A comparison of the crystals with the orthographic projection of idealized anthracene crystals[1] revealed that the dominant face was (001); adjoining faces were (110), (1$\bar{1}$0), ($\bar{1}$11), ($\bar{1}\bar{1}$1), (20$\bar{1}$) and ($\bar{1}$01). The ($\bar{1}$12), ($\bar{1}\bar{1}$2) and (100) faces did not develop to the recognizable level.

In most of the crystals, the contrast was homogeneous in crossed polarized light. However, some crystals showed contrast fluctuations, indicating lower perfection. The crystal faces were free from growth spirals. The main feature observed was the presence of growth islands on the (001) faces (figures 1–3). The islands appeared like triangles (figure 1) and caps (figures 2 and 3). Some islands (circled in figures 1 and 2) have rhombic shape. When the (20$\bar{1}$) and ($\bar{1}$01) faces do not appear, the hexagonal anthracene crystals assume the rhombic habit[1]. It is interesting to note that in the case of a crystal of anthracene assuming the rhombic habit the two pairs of its non-basal faces belong to two different families, i.e. {110} and {111}; the faces being ($\bar{1}$10), (1$\bar{1}$0) and ($\bar{1}$11), ($\bar{1}\bar{1}$1). Depending upon the relative growth rates of {110} and {111} faces, the crystal can assume different habits. For example, in the present case, it can be noticed in figure 1, that there is a large difference in growth rate between the {110} and {111} faces. As a result only a pair of faces developed well, thus giving a triangle-like appearance to the growth islands. Two growth islands in figure 1 (circled) indicate a relatively smaller difference in growth rate between the {110} and {111} faces. It can be visualized that the rounding or smoothening of the sides of the triangle-like islands yields cap-like figures.

Crystals of anthracene grown under a variety of conditions exhibit several different habits but no polymorphism[1]. Therefore the case of iso-epitaxy can be ruled out.

The following interpretation can be offered to explain the rounding of the faces of the triangular islands leading to the formation of cap-like figures. It can be visualized that when the level of the

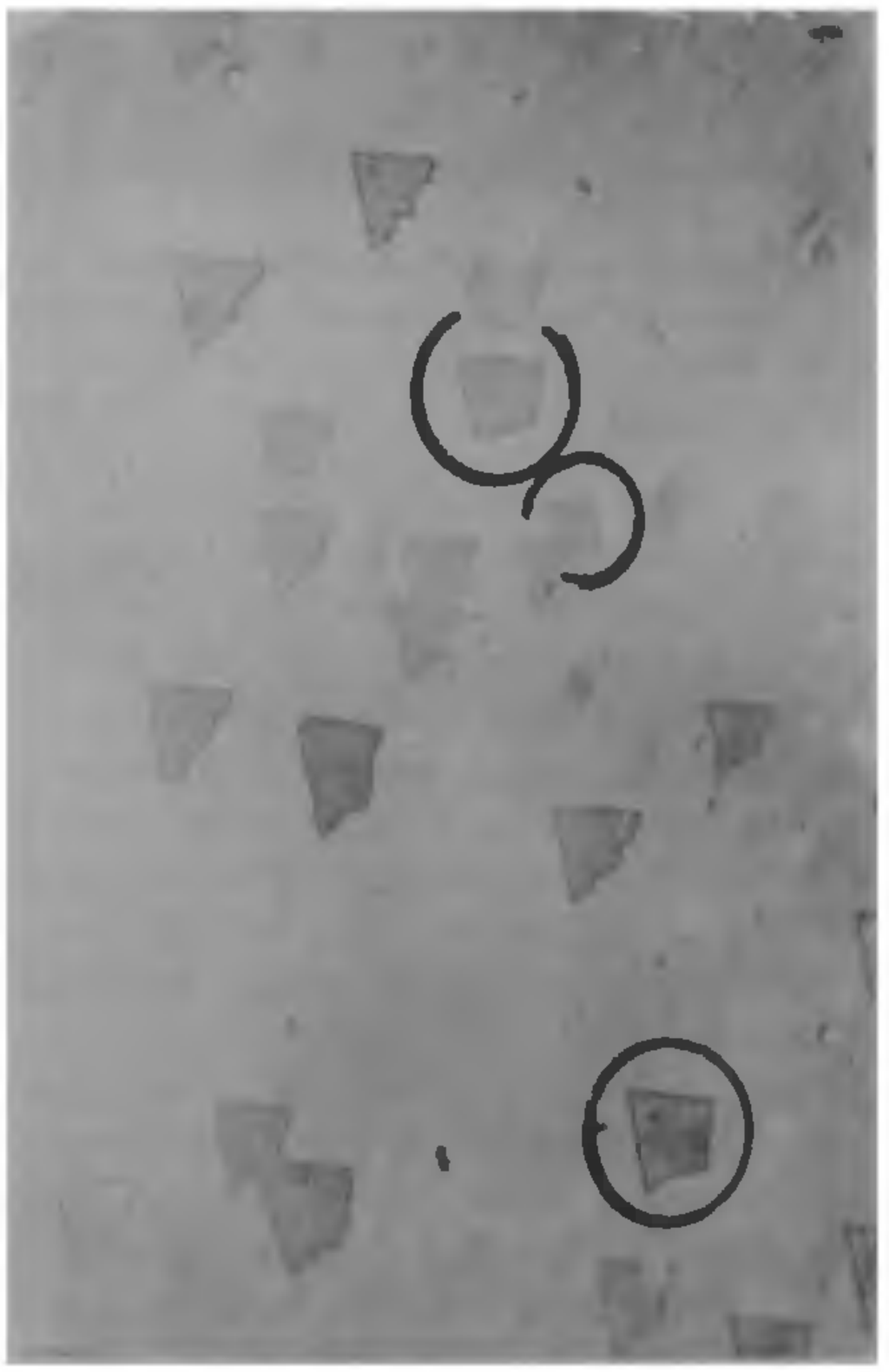

Figure 1. Triangular growth islands on (001) face of a hexagonal anthracene crystal. Circled islands have a comparatively smaller difference in growth rates between the {110} and {111} faces. Polarized light, 100 ×.

Figures 2 and 3. Cap-like growth islands having rounded or smoothened sides. The circled island is rhombic in shape. The smoothening is more pronounced in the case of islands shown in figure 3. Polarized light, 100×.

solution in the container and the thickness of a crystal growing on the bottom become equal, then the upper face of the crystal may retain a thin film of solution and the solute left in such a thin film may not be sufficient to deposit complete layers. The result is that the already present 2D nuclei on the crystal face grow further only to a certain extent. If, on such a process, the situation of increase in the supersaturation of solution film (achieved by cooling the solution) is superimposed, then it can lead to smoothening of the faces.

It was established in the case of solution-grown biphenyl[2] and naphthalene[3] that if the supersaturation of the solution crossed a critical higher supersaturation value, then a roughening transition took place in the growing crystals; the crystals became non-faceted. It can therefore be envisaged that the presently observed smoothening of the growth islands can well be due to a roughening transition, triggered by an increased supersaturation in the thin film of solution present on the anthracene crystal faces.

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INDUCTION OF ACIDOSIS BY ACUTE ORAL EXPOSURE TO INSECT REPELLENT N,N-DIETHYLPHENYLACETAMIDE IN RATS

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N,N-Diethylphenylacetamide (DEPA) is a new mosquito repellent superior to many known insect