MICROSCOPICAL EXPLORATION

THIRTY EIGHT

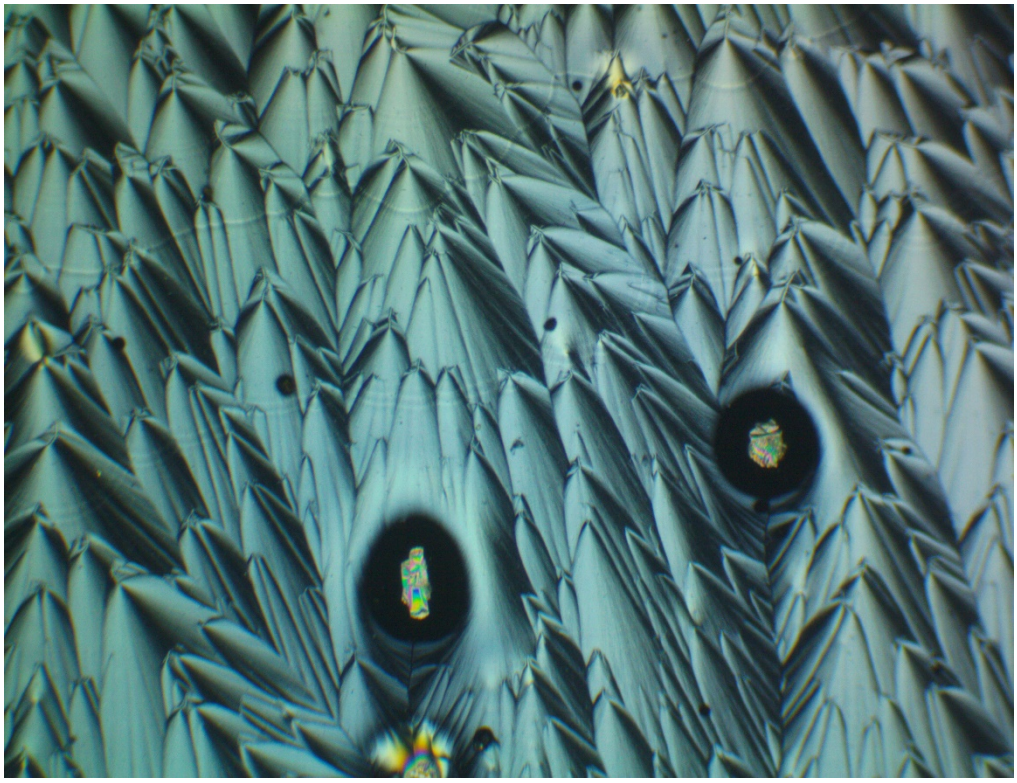
PAST SLIDES REVISITED AND REVITALISED

During past Microscopical Explorations specimen slides of various substances were prepared, and many of those slides were retained for future reference. By sheer coincidence, that future just happens to be NOW… November 2024!!!

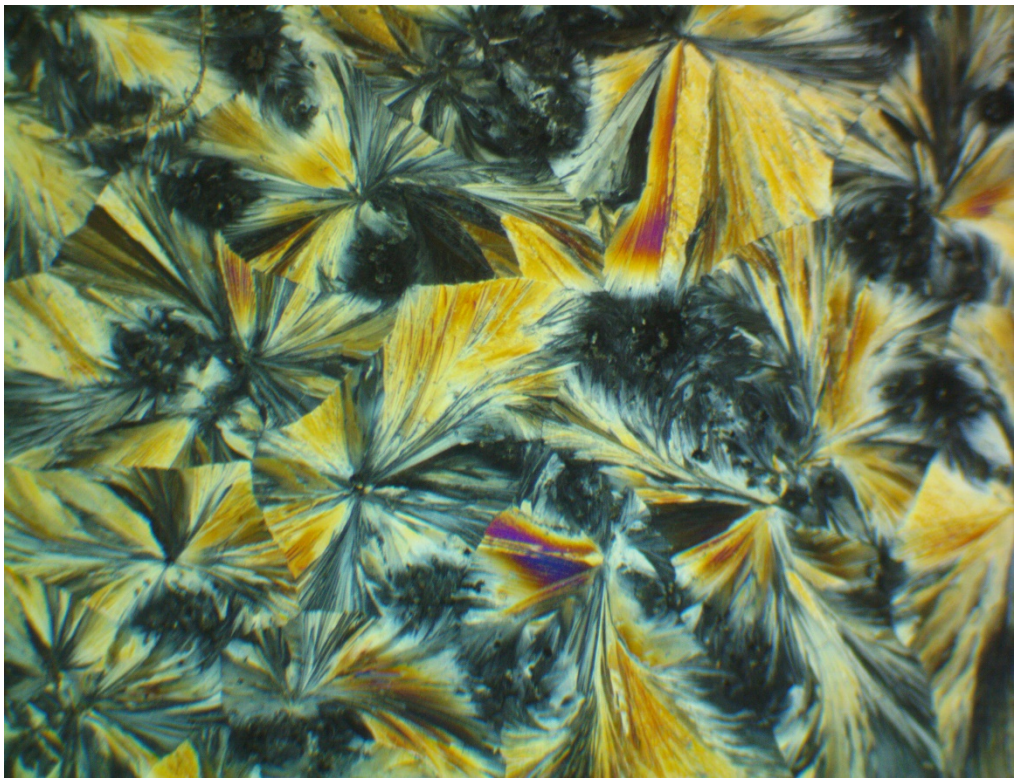
The slides referred to above were mostly prepared by pipetting a known volume of a solution of the compound under scrutiny, in either ethyl ethanoate or industrial methylated spirit, onto a clean glass microscope slide and allowing it to evaporate to dryness without the use of cover slips. After observation for the relevant Microscopical Explorations the slides were stored in simple non-airtight plastic slide boxes as shown in the following picture:

As can be seen from the picture, the slides under consideration are of: Ascorbic acid, Citric acid, Malic acid, Tartaric acid, mixed Amino acids (ß-Alanine and L-Glutamine) and Paracetamol.
All of the compounds listed exhibit a certain degree of hygroscopicity, and, due to this combined with their un-sealed storage, they might be expected to degrade over time due to absorption of atmospheric moisture. Because of this it was decided that rather than using images from previous Microscopical Explorations, new images of the slides as they are now would be captured as the starting point for ME38. Consequently, an image of each slide between crossed polars was captured using the x4 objective of my Swift SW380T microscope focused on the centre of the slide. Those images are shown below.

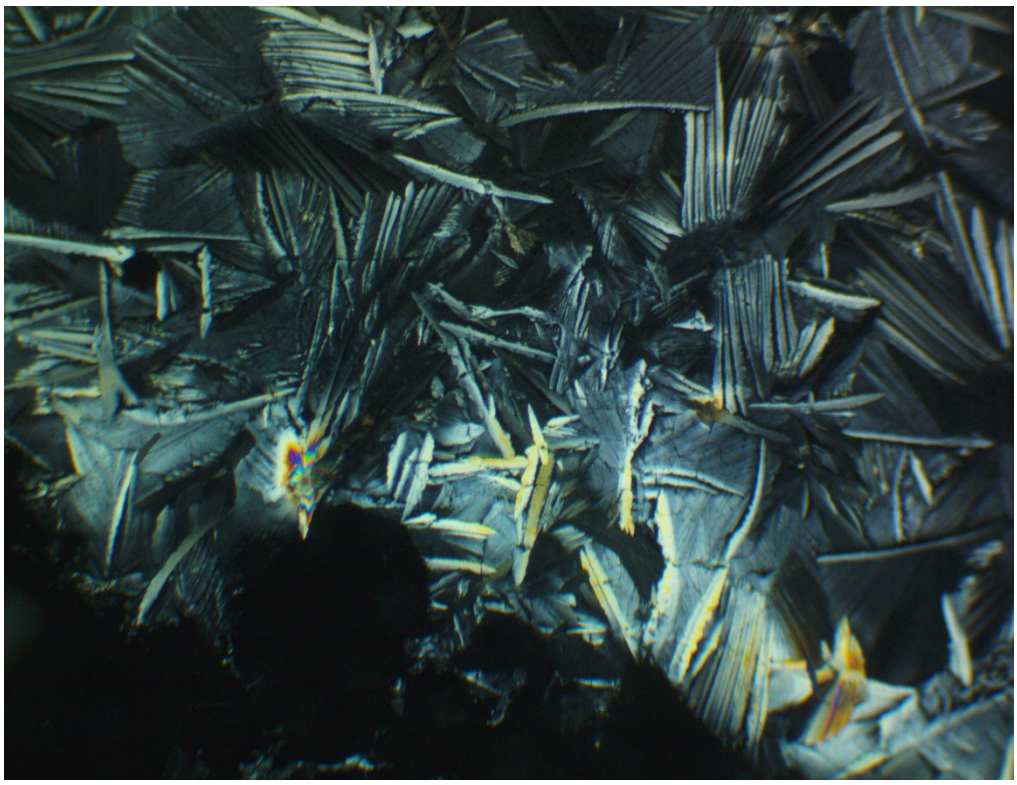
Ascorbic acid Re-visited



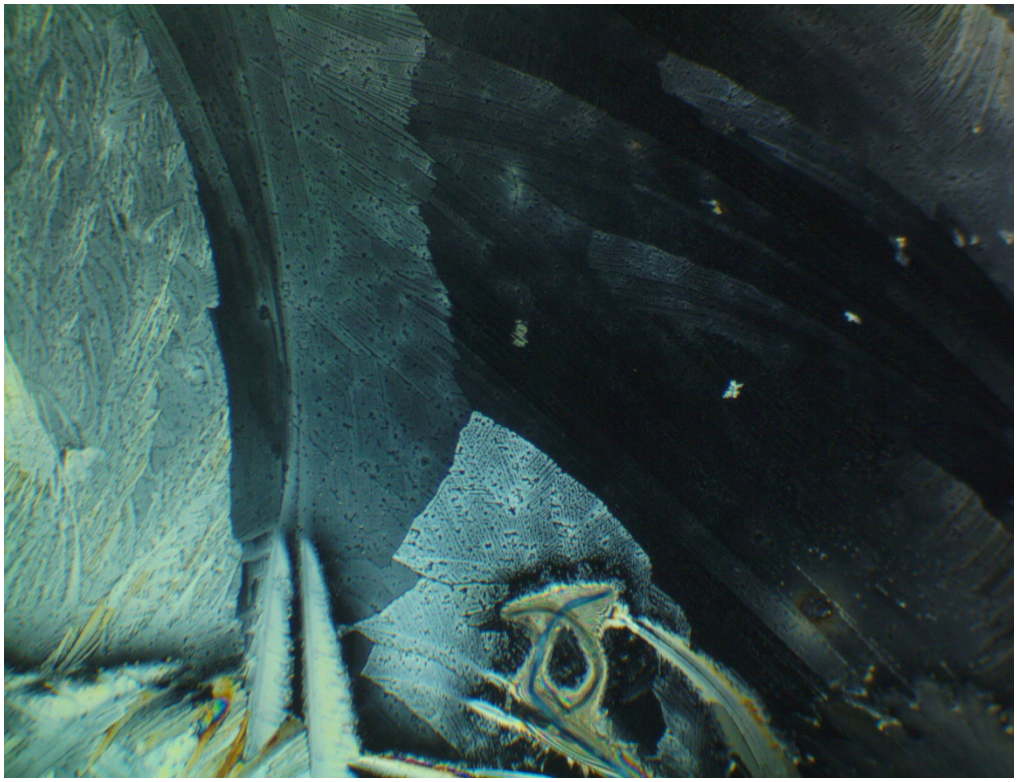
Citric acid Re-visited



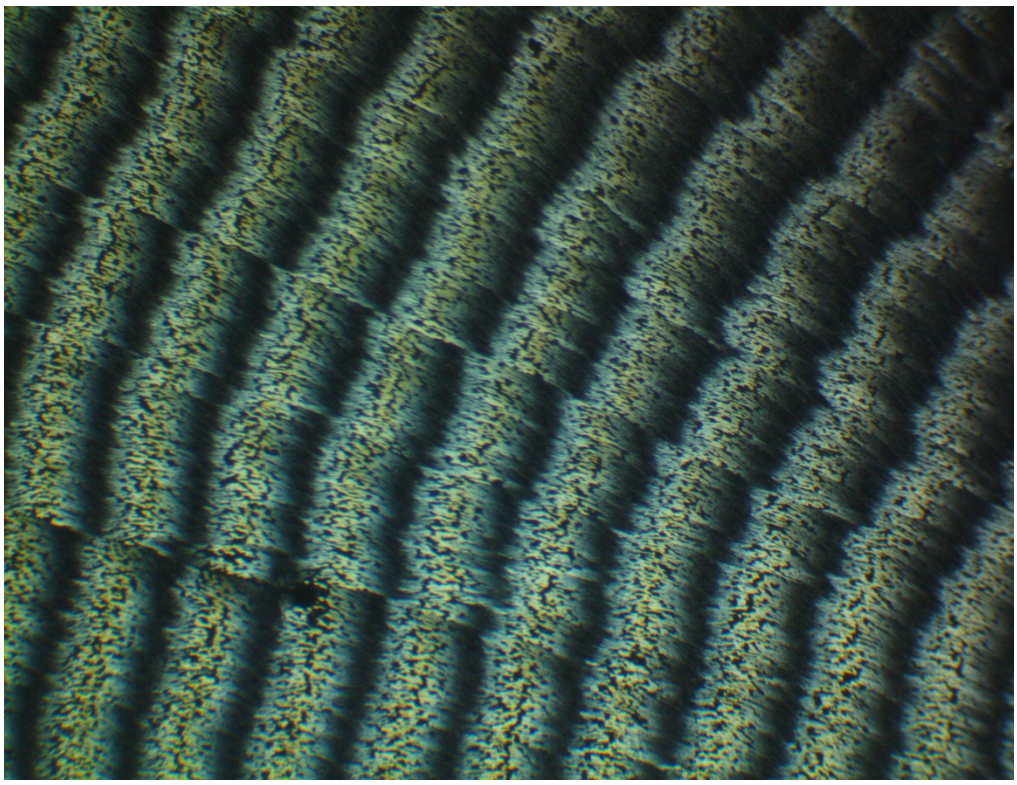
Malic acid Re-visited



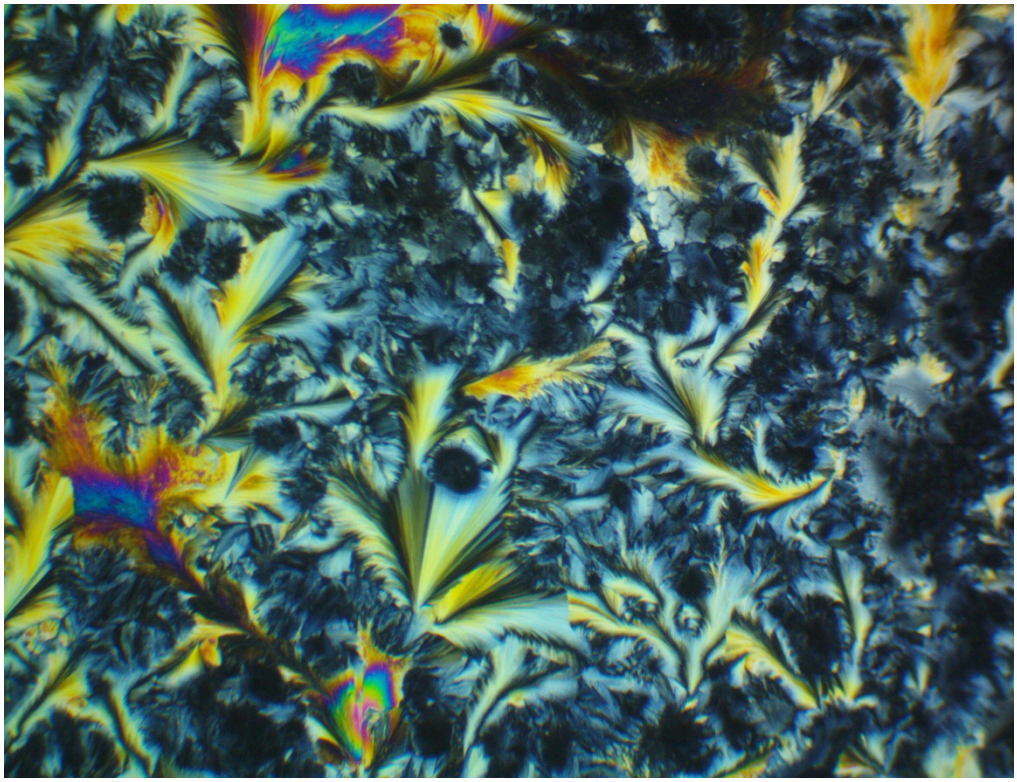
Tartaric acid Re-visited



Amino acids Re-visited

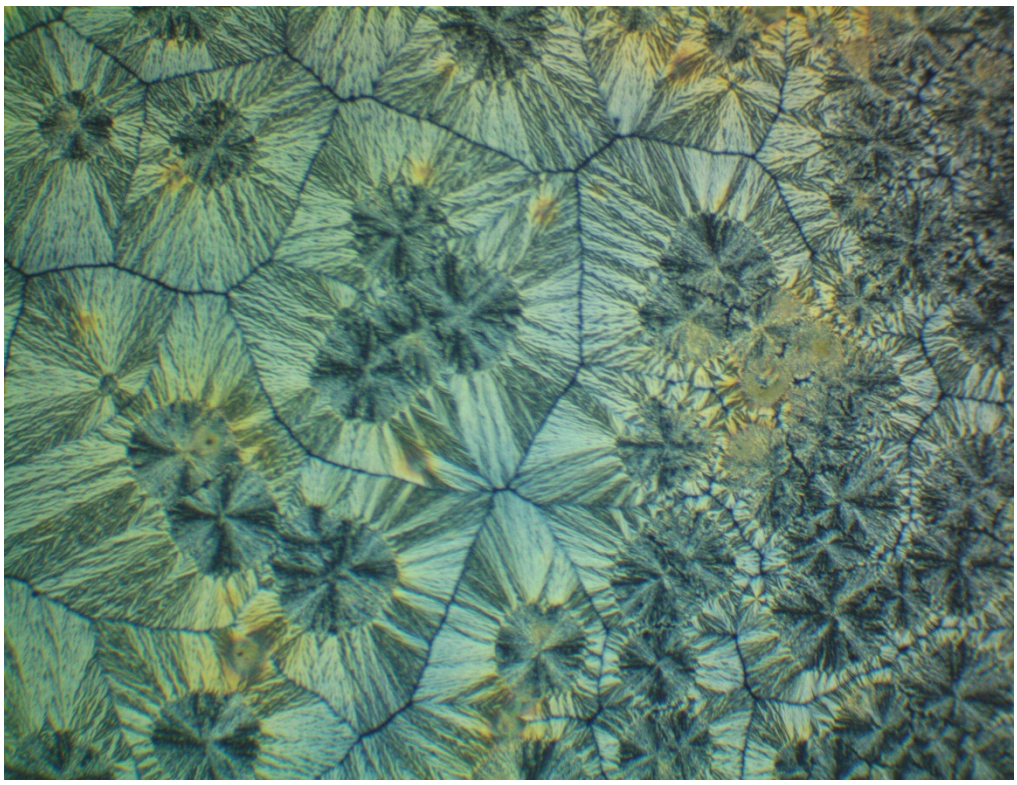


Paracetamol Re-visited

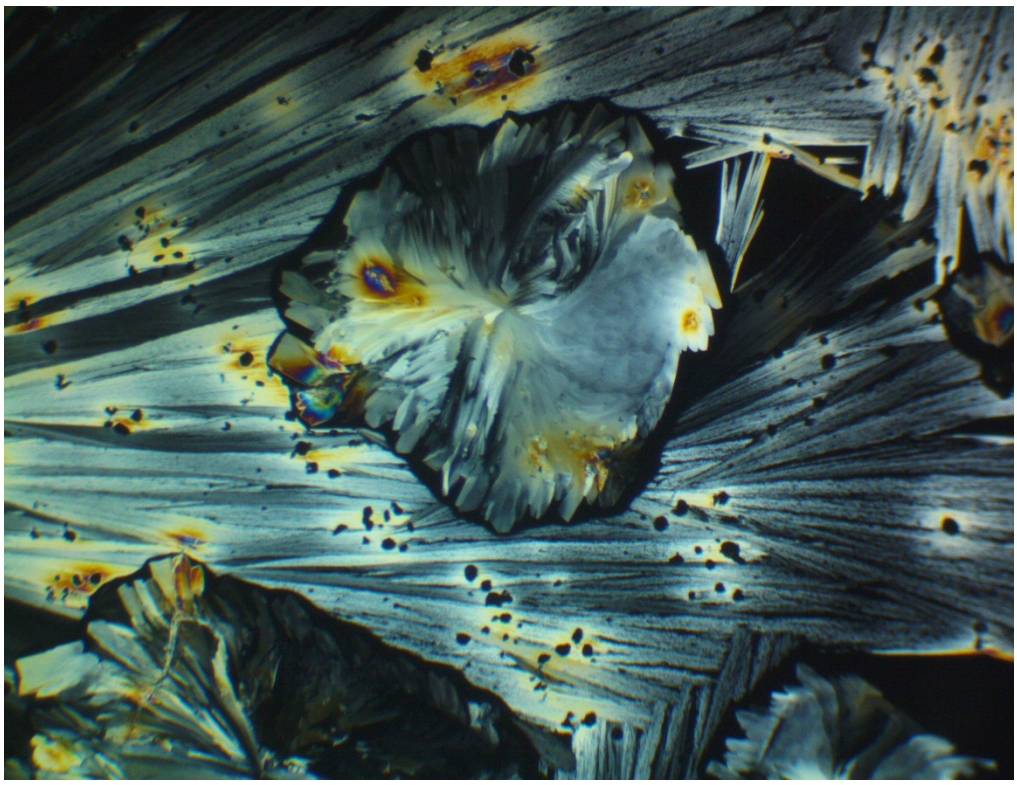


Next, what is meant by revitalised? For the purposes of ME38 it means that firstly, the slides were placed on the fins behind the room central heating radiator and equilibrated to approximately 45°C. Then, 200µL of Industrial Methylated Spirit were pipetted onto the centre of each slide, causing the specimen on the slide to dissolve. The slides were then left on the radiator at 45°C for thirty minutes to allow the solvent to evaporate and the specimen to re-crystallize.
In order to observe the effect of the procedure, the position of the microscope mechanical stage remained unmoved after the initial observation which meant that the same point on the specimen slide could be observed post revitalisation. The images below show the results of the revitalisation process.

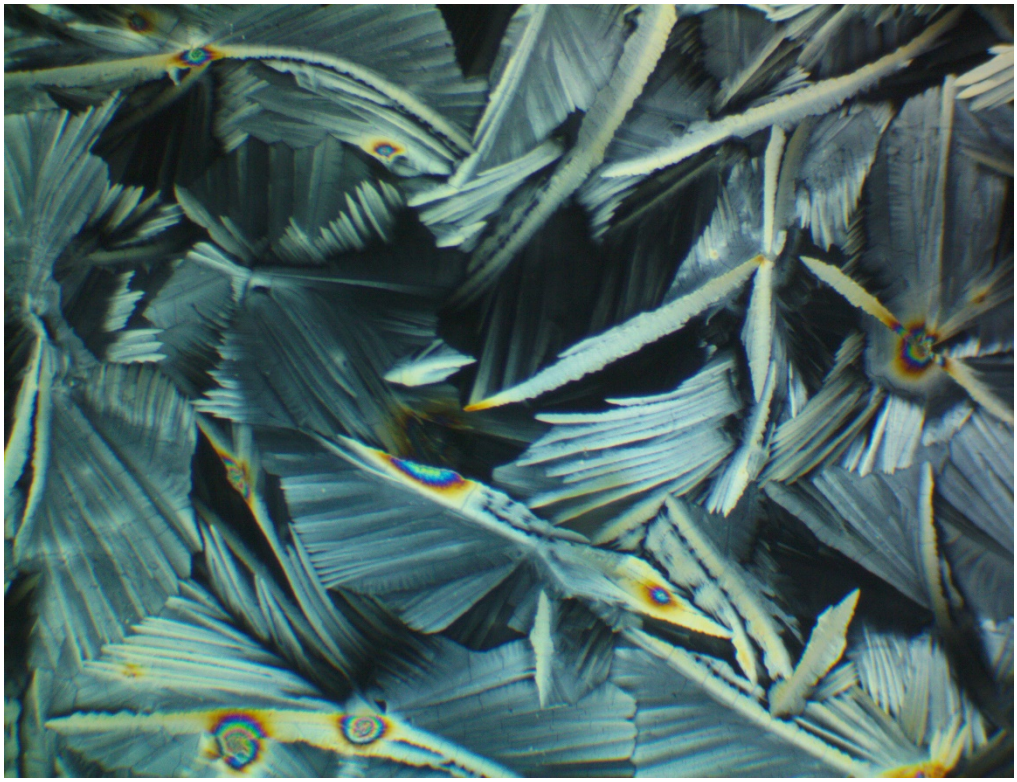
Ascorbic acid revitalised



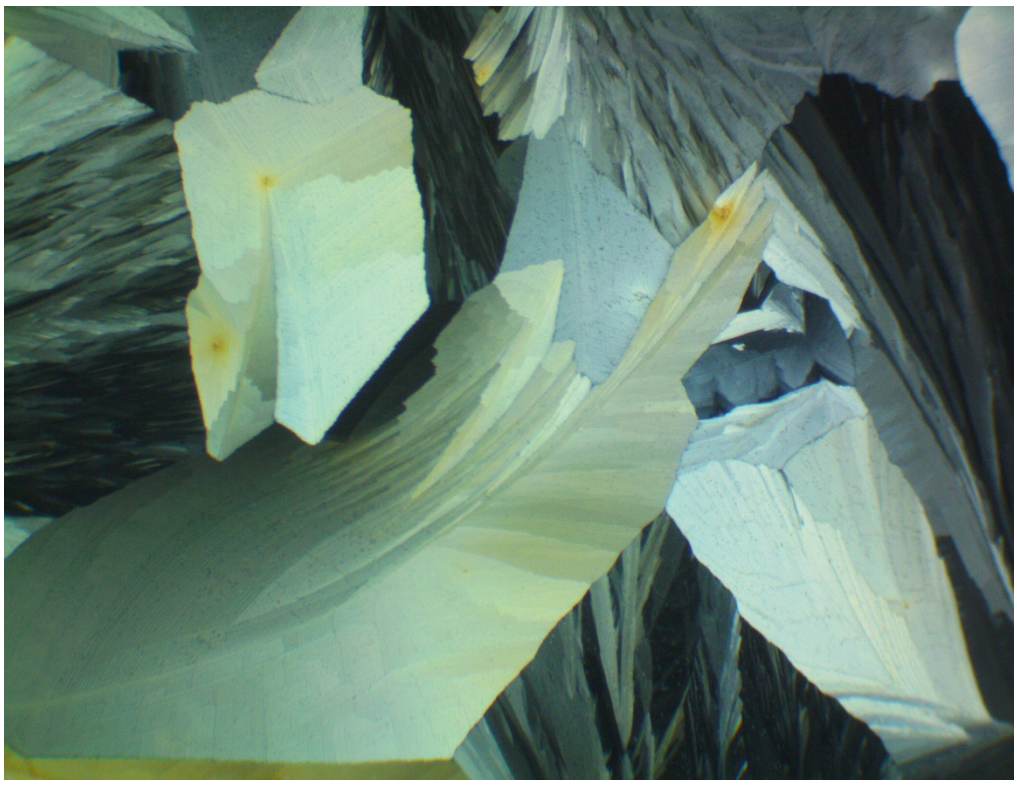
Citric acid revitalised



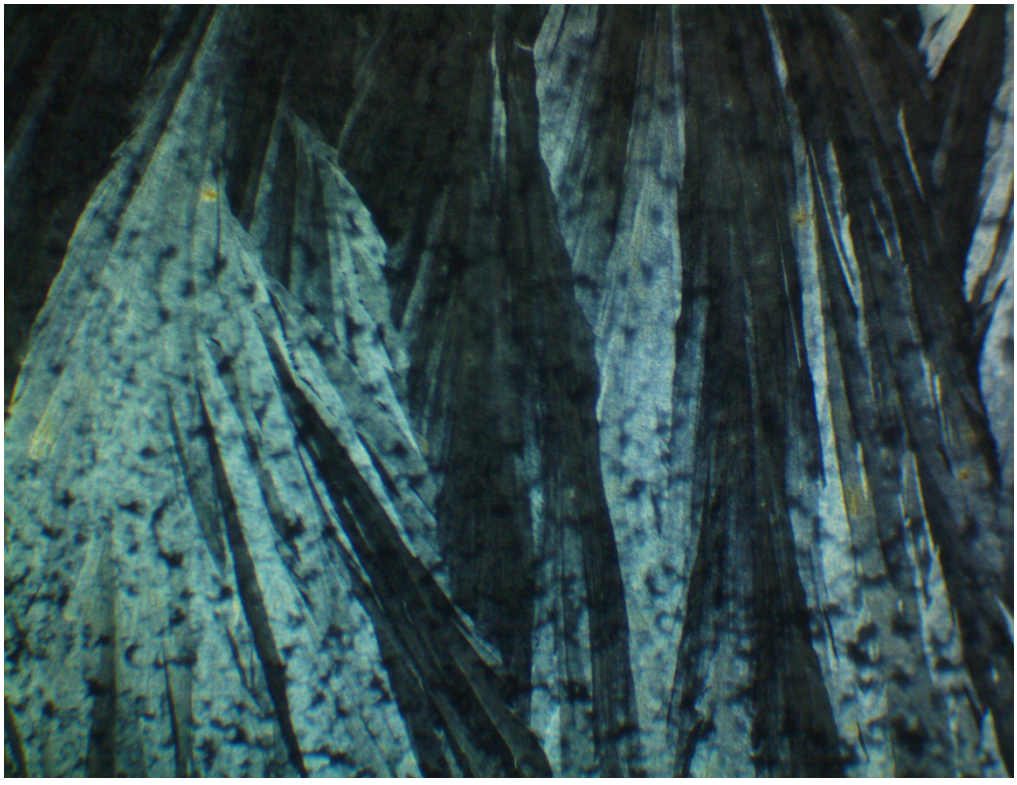
Malic acid revitalised



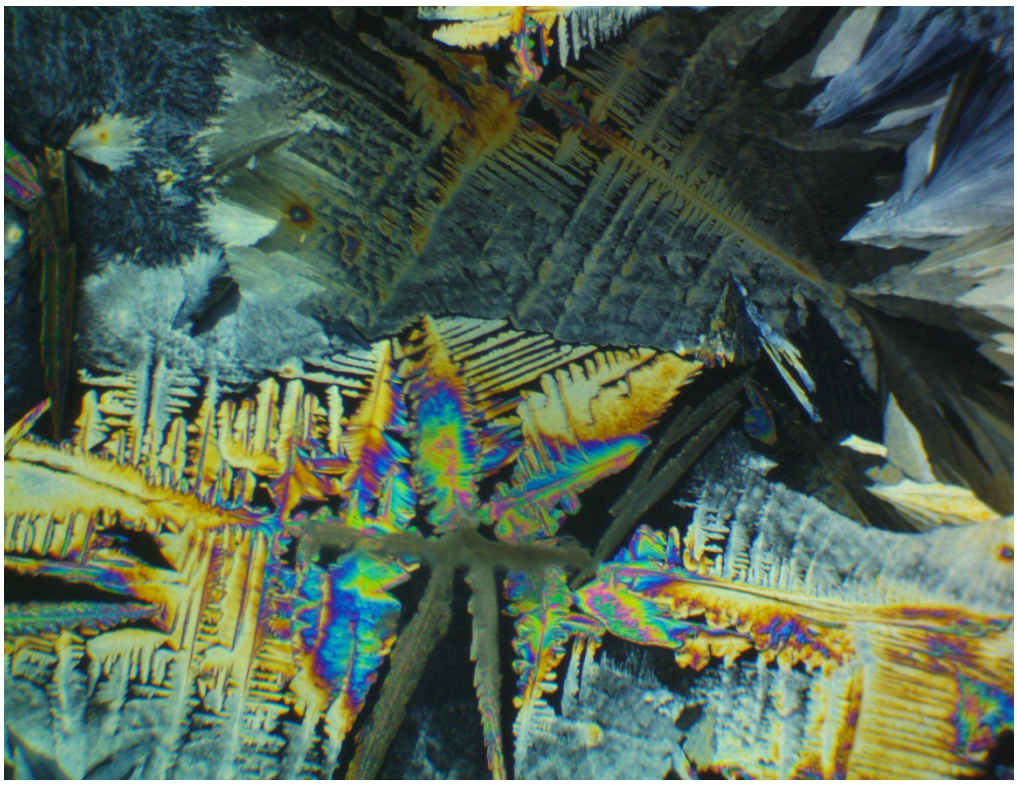
Tartaric acid revitalised



Amino acids revitalised



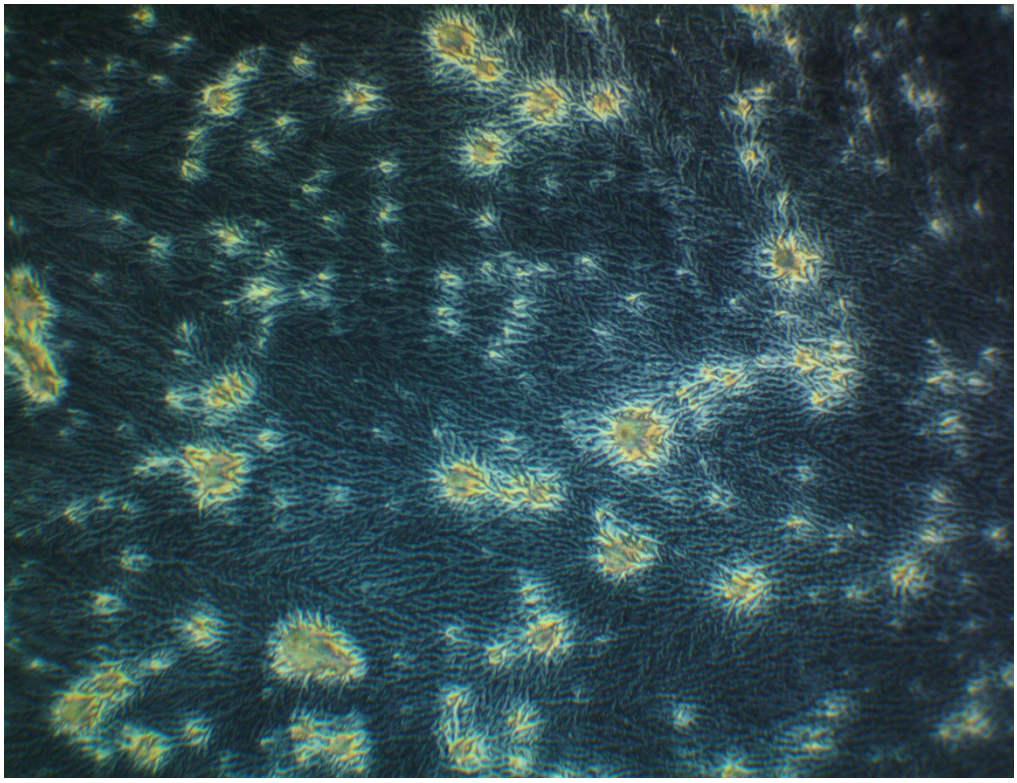
Paracetamol revitalised



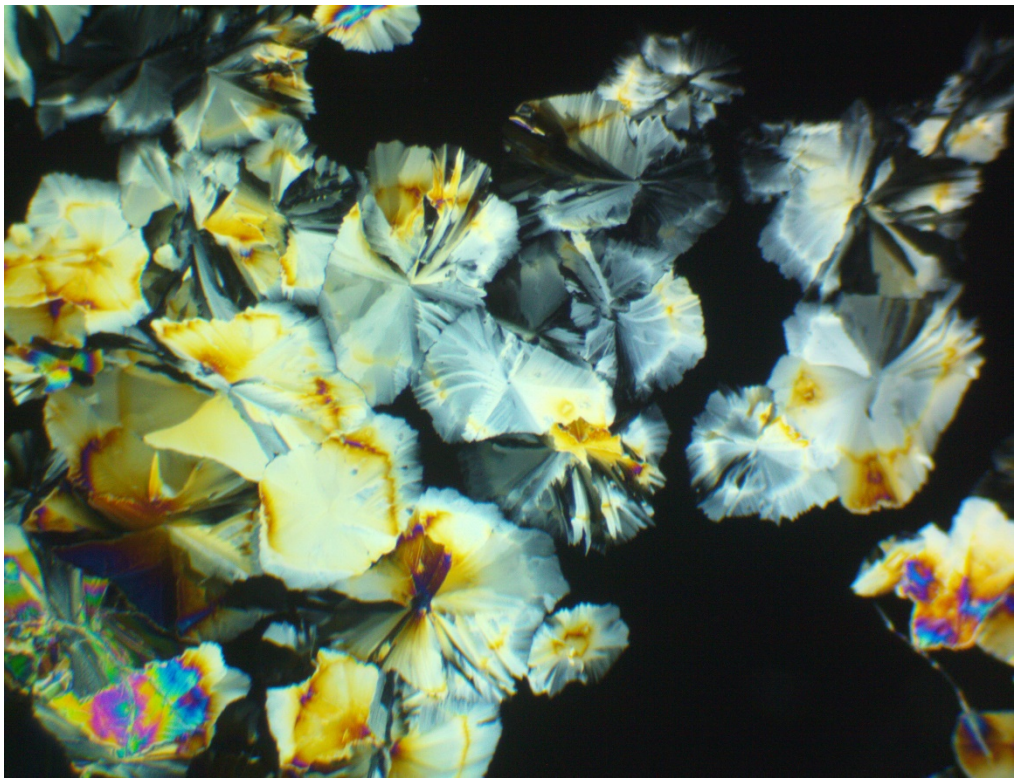
Having treated the slides once as detailed above, what would happen if they were treated similarly a second time, but this time at room temperature?
Only one way to answer that question…the slides were placed flat on the bench and another 200µL of industrial methylated spirit were pipetted onto the centre of each one. This time the slides were allowed to recrystallize overnight at about 20°C

When the same point on each slide was observed for the third time further changes in the shapes of the crystals were observed and are shown in the images below.

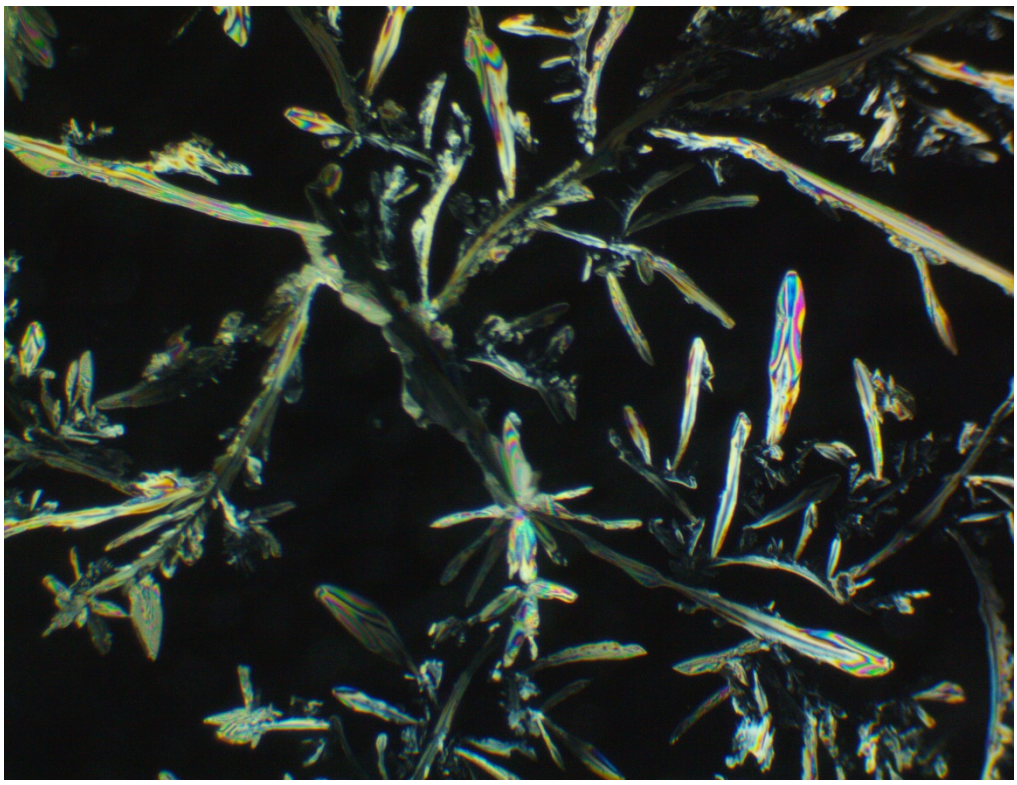
Ascorbic acid 2nd revitalisation



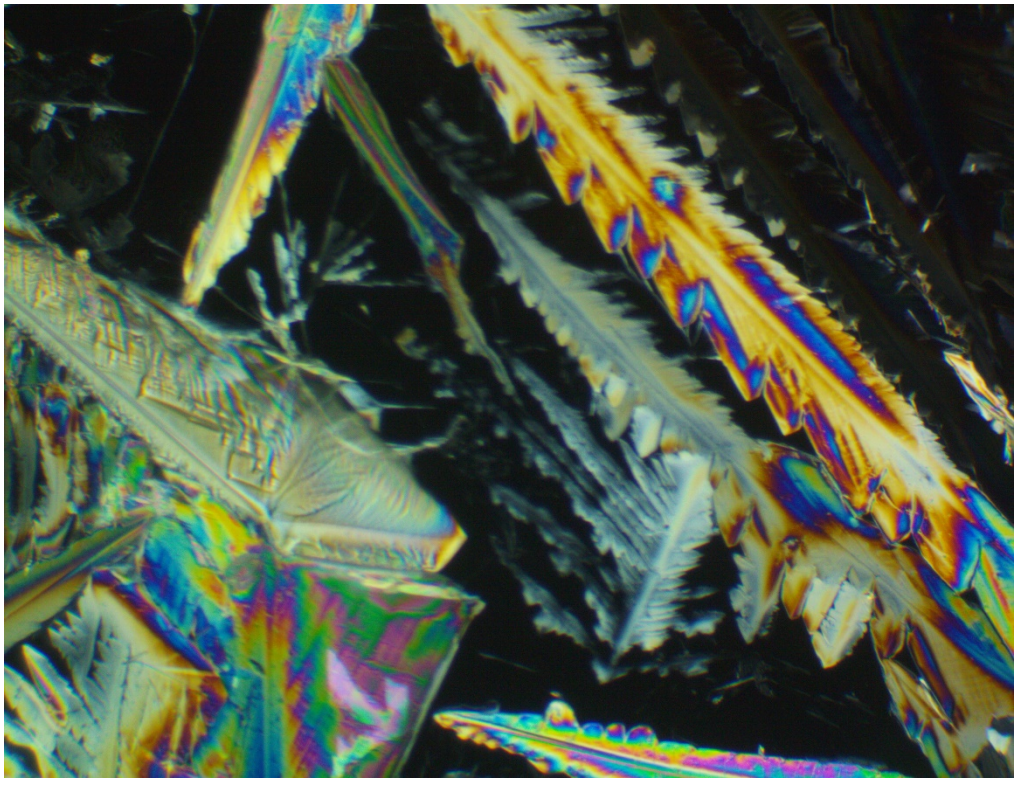
Citric acid 2nd revitalisation



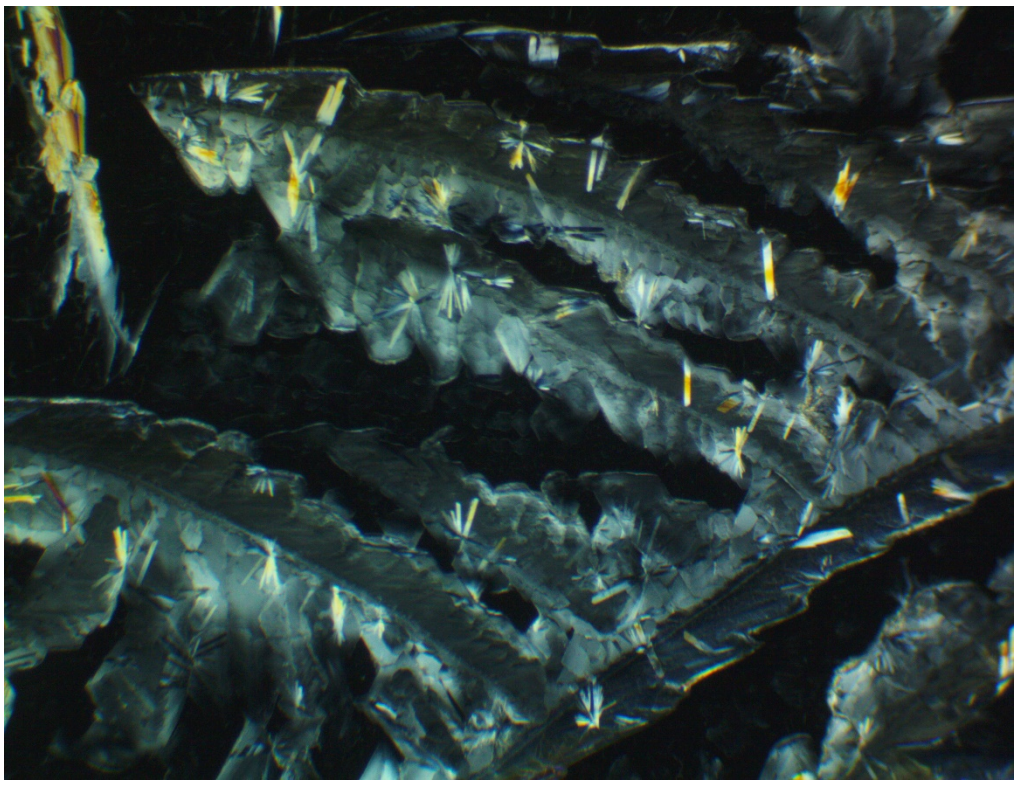
Malic acid 2nd revitalisation



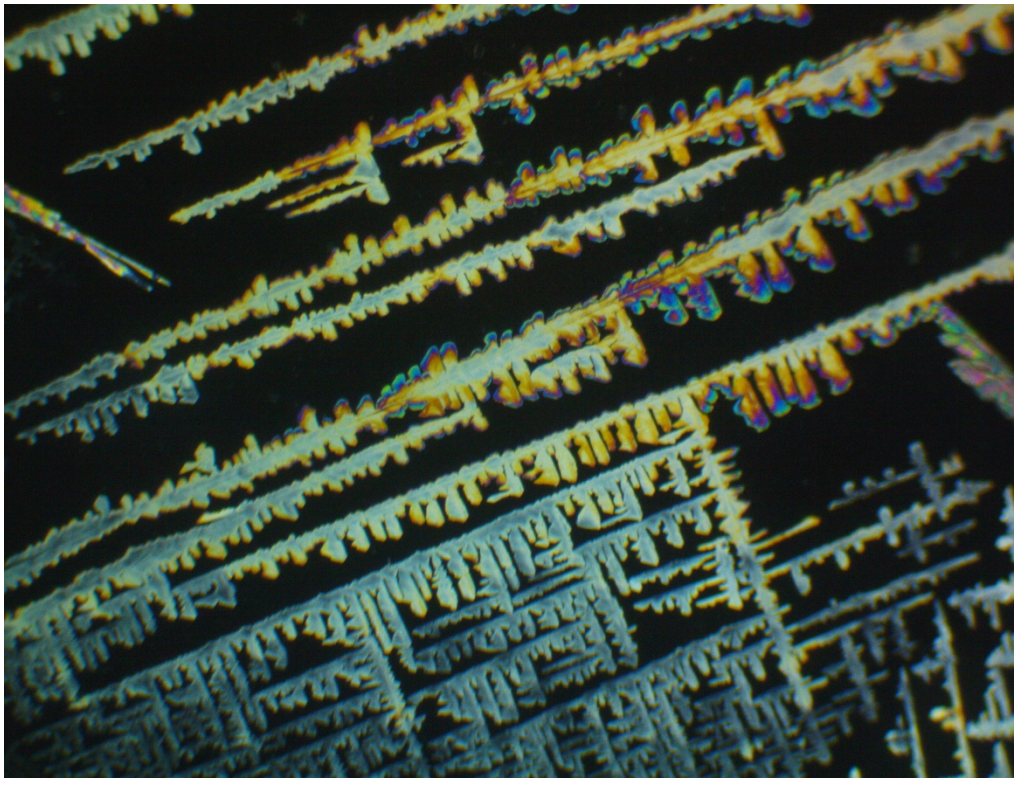
Tartaric acid 2nd revitalisation



Amino acids 2nd revitalisation



Paracetamol 2nd revitalisation



Draw your own conclusions, dear reader, about what appears above, but it should be noted that the aim of ME38 was to keep the author occupied in his la'al lab for as long as possible, and out from under the Boss's feet.

James Stewart
Cumbria
UK

As we say here in Cumbria:

'Ave a go yersel'!

Comments, gratefully received, to:

stewartr178ATyahooDOTcoDOTuk

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