Microcrystals and how to grow them, update

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Many years back I wrote a short article on how to grow microcrystals and view them through the microscope by polarized light.

Those were the not-yet-digital days. Luckily we now all have digital means to view, photograph and film.
My own equipment is an Olympus BH2 fitted with pol-filters and mounted with an Olympus OM-D E-M5 camera. I also make use of a computer monitor connected to the camera, allowing for adjusting the scope while staying in my chair. This is my working place:

In my contacts with other crystal makers on Facebook I discovered that there are many methods to obtain crystallizations. Some use coverslips on a drop, some melt chemicals, others very carefully measure quantities of the chemicals they use, or they make saturated solutions.
I don't do any of those things, so it is my own method and experience of many years that I will explain here.

Chemicals are all around us. Our own cupboard contains many of them. When you plan to give it a try, start there. Cleaners, detergents, stain removers, artificial sweeteners, plant fertilizers, baking powder, decalcifiers, salt and sugar, many of those will surprize you. Every brand is different.

Medicins and vitamins (the B family) are often worthwhile too, but pills only have a small amount of the working component; the rest is filling. The pure stuff is always better.

As you can see in the picture I use pipette flasks. The advantage is that they are easy to use. and the fluids can be kept for a long time. It's a very economical way to use chemical recources with less spillage.
Test tubes are also useful, and cheaper, but then you need a rack to place them in.

Making a solution is (for me) rather random: about half a teaspoon of a chemical in a flask of 10ml.
Most chemicals dissolve in water (tap water is fine in most cases), but sometimes you need alcohol 96%.
When something doesn't dissolve, try another solvent.
Fluids like detergents or fertilizers can be used without, or with adding water.

The slides you use are rather hydrophobic by nature. A solution will not spread out by itself.
So I wash my slides always in plenty of dishwashing soap, and then spread them out between two towels to let them dry. Marks of soap can be removed easily afterwards. The great advantage is that now surface tension is reduced and the fluid can be spread out over the total surface. Like this:
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Now there's a lot of potential pictures in there!

There are no rules for crystallizing a fluid. It all depends on its characteristics.
I use a tealight and move the slide slowly, less than 1 inch above the flame, with my thumb and forefinger.

Sometimes crystallization starts almost immediately. But in many cases you have to wait a minute or so.
And sometimes it doesn't crystallize at all. The fluid has probably evaporated before crystallization started.
Put those slides away in a dustfree place, maybe they 'do' something in time. Or just try again.

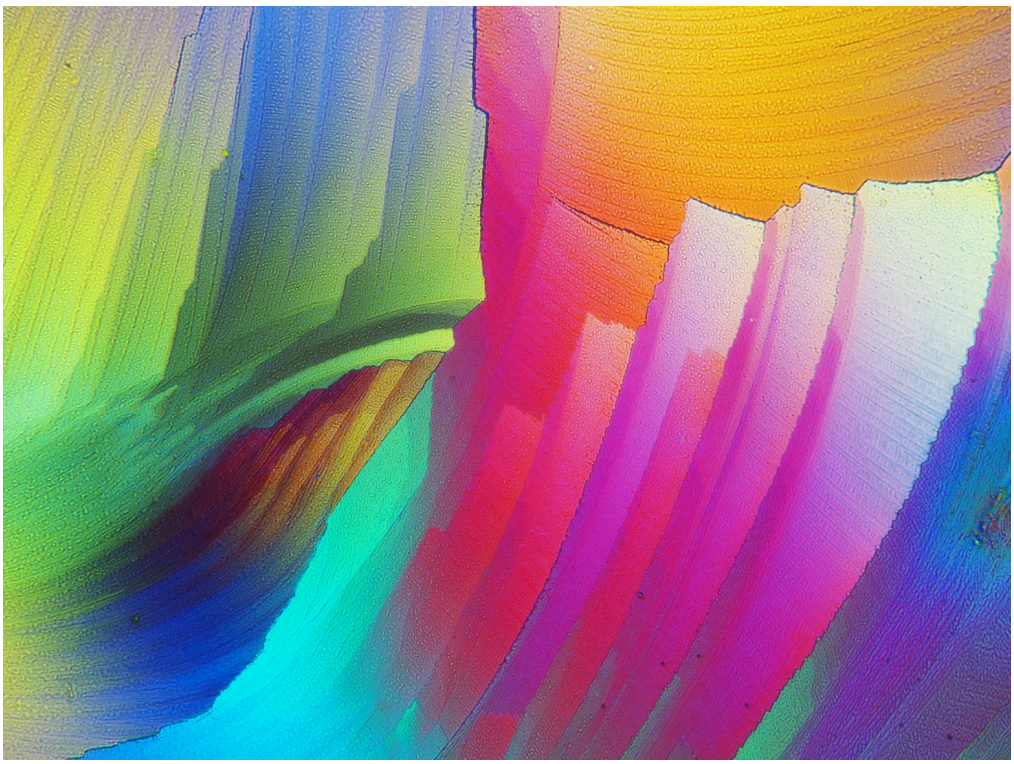
Changing from the hot flame to a cool place may also help. It's all a matter of trying.
Most fluids also crystallize without the help of heat. The crystals then grow bigger, and less intricate.
But on one slide you can often also find crystals of many shapes, due to the circumstances that made them grow.
Warning: be careful with a solution in alcohol; it may start to burn when you hold it too close to the flame.

Chemicals can be crystallized on their own, or in combination with something else. That 'something else' doesn't have to be another chemical, it can also be a drop of an energy drink, for example, or whatever comes to mind. Most of my own crystallizations are made from more than one component. Mixing I do ***on the slide***, not beforehand. You can use plastic pipettes or wooden toothpicks for the mixing. Keep soft tissues near to absorb dripping from the slide.
Every mixture is different: two drops of chemical 1 and 1 drop of chemical 2 gives other results than the other way round. That keeps experimenting exciting!

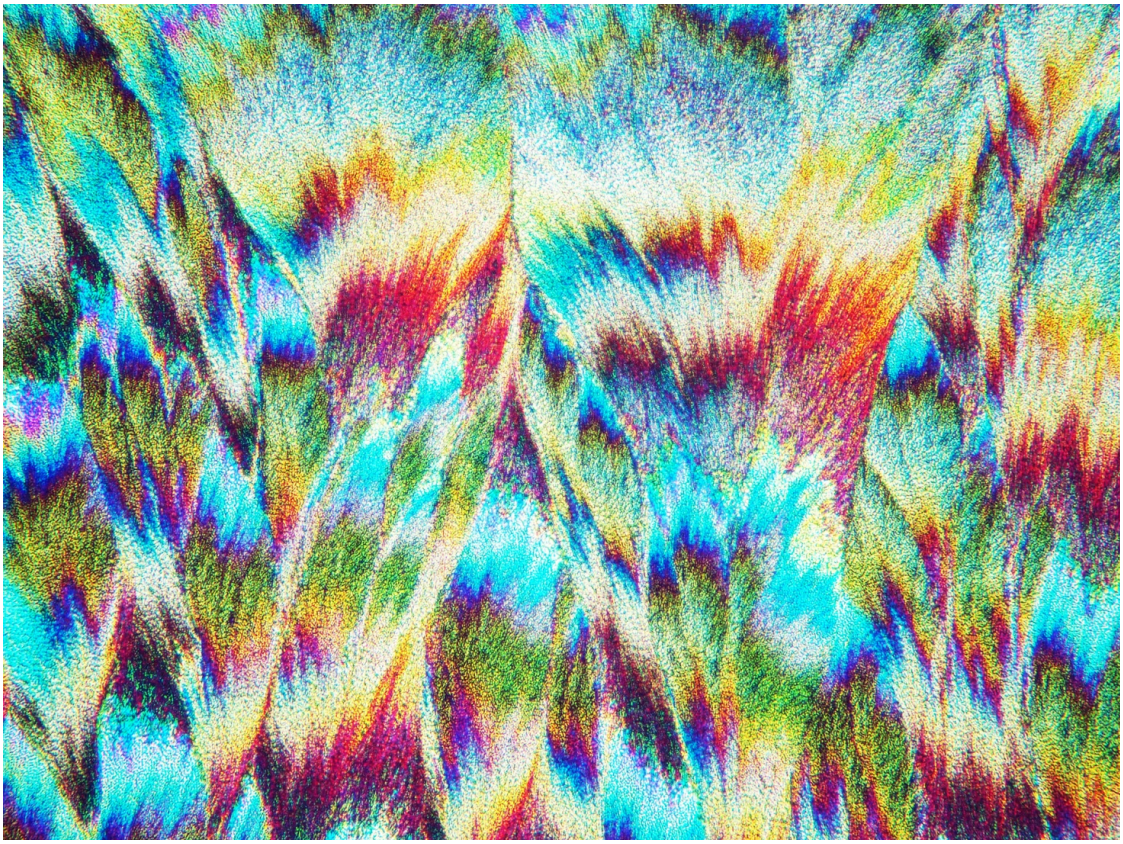
In the past it was easy to obtain chemicals from pharmacies or chemical companies. That is no longer the case. There are laws in place (at least in my country but I suspect in England it is no different) to prevent us from terroristic bombmaking or setting up a drug laboratory, so unless you have a company you can't order from Big Chem any longer. Pharmacies don't usually make their own medicins like before, so that's no longer an option eather.
But there are other ways.
eBay and Amazon sell chemicals. Bodybuilding companies sell chemicals. Drugstores sell chemicals for people who want to make their own beauty products. Vitamins are not difficult to obtain, so many health freaks around. But when you order, be carefull to order *powders*, not pills or capsules. Just Google a bit.

As for polarization, the most important thing in working with crystals:
Every scope, even a stereo, can be adapted for polarization. There are other articles on Micscape that go into that, so I don't.
But what you need, apart from polarization filters, are 'retarders'. They cost nothing when you use plastics or cellophane, and little when you use mica sheet. Depending on the thickness of the plastic put over your polarizing filter (the one beneath the object table) the colors come in a great variety. Manipulate and experiment as much as you like. Being creative is the main thing. Have fun!

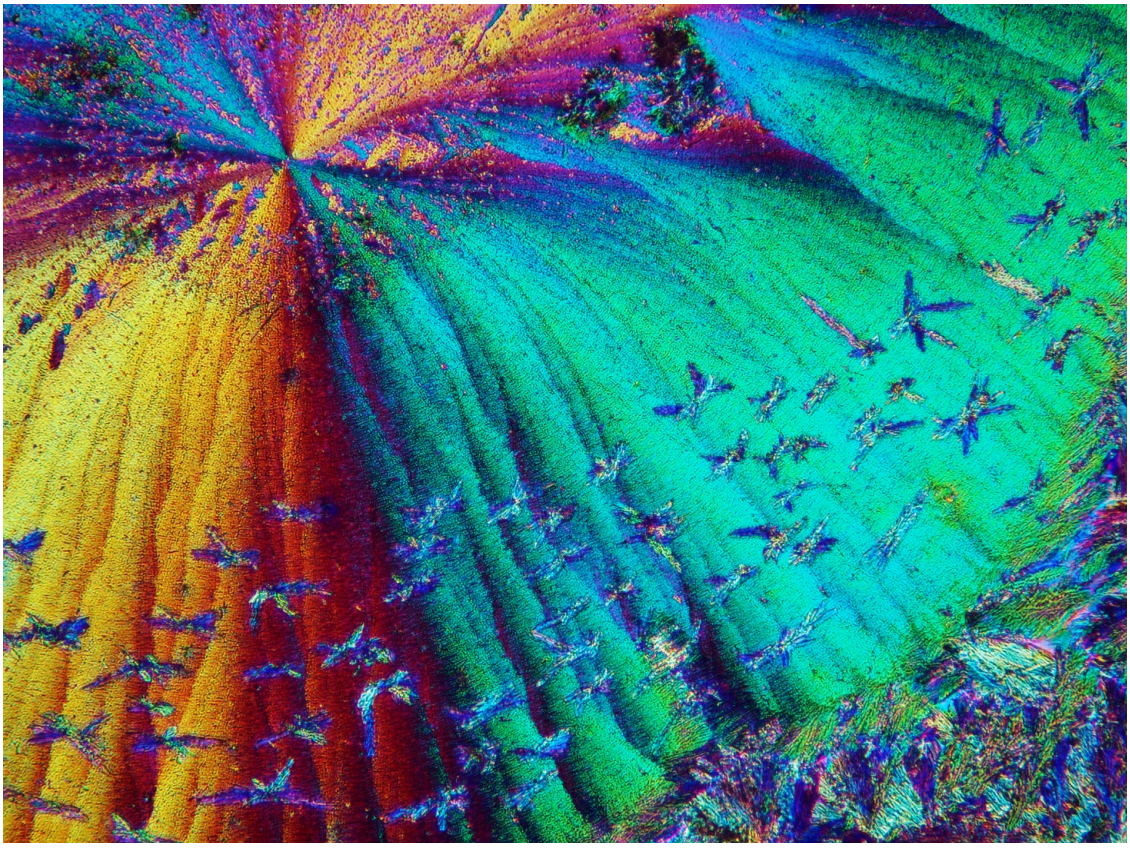
Here are some pictures.
For questions, my email is info@scienceart.nl and my website www.scienceart.nl



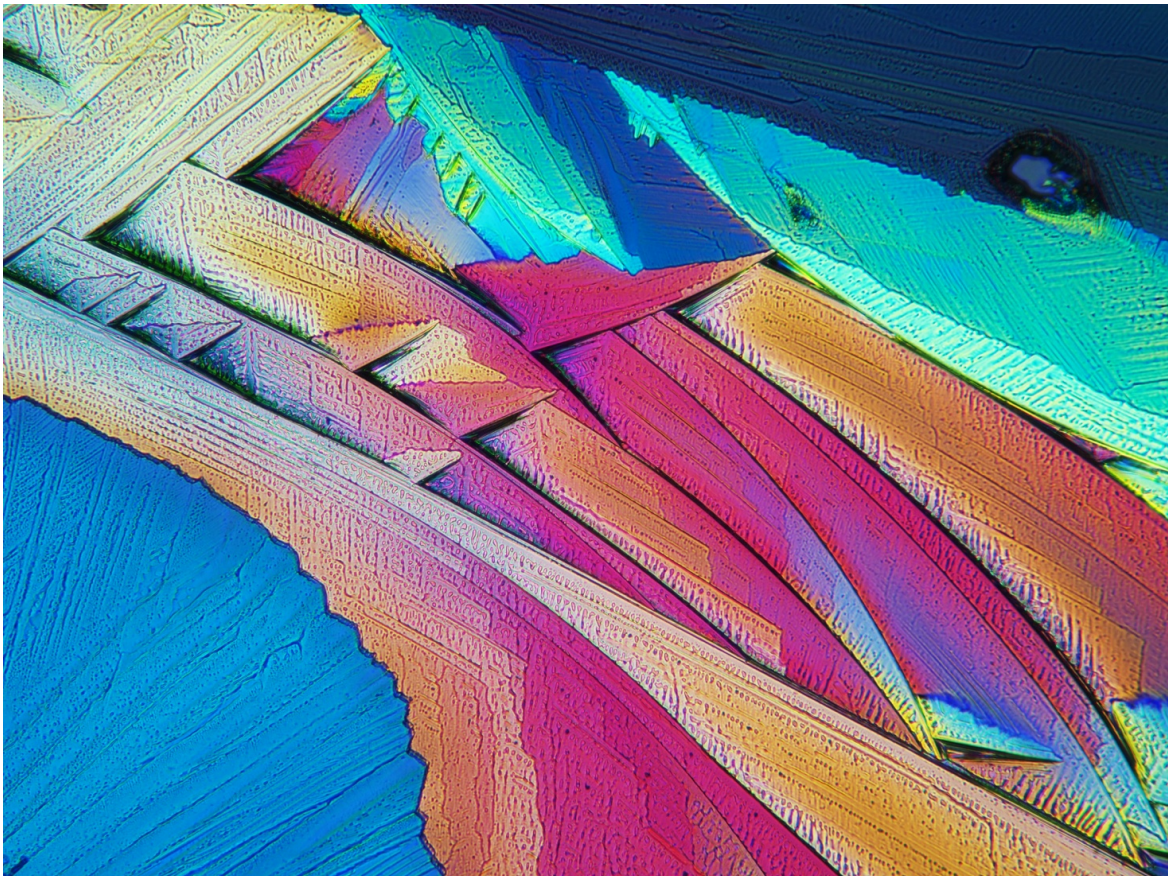
Urea & Gluconic acid



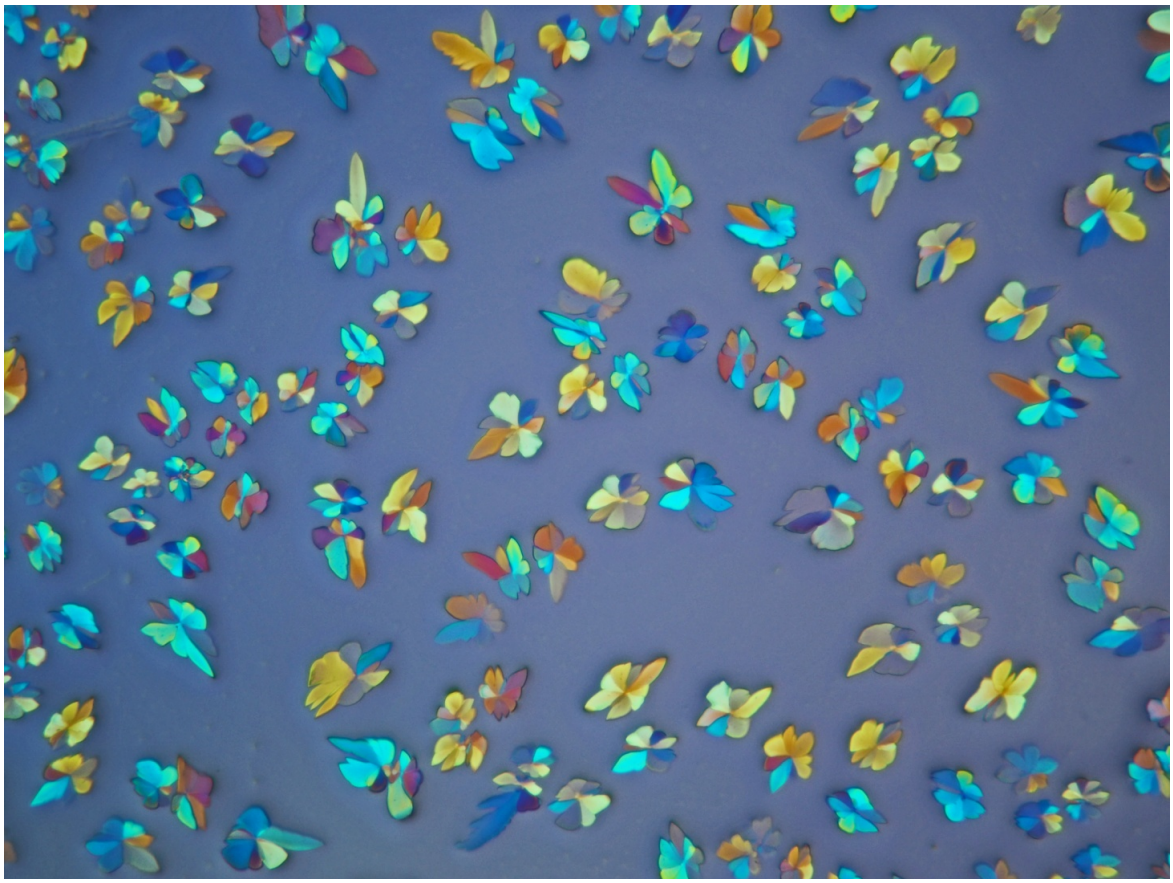
N-acetylcysteine (NAC)



Boric acid & Saccharin

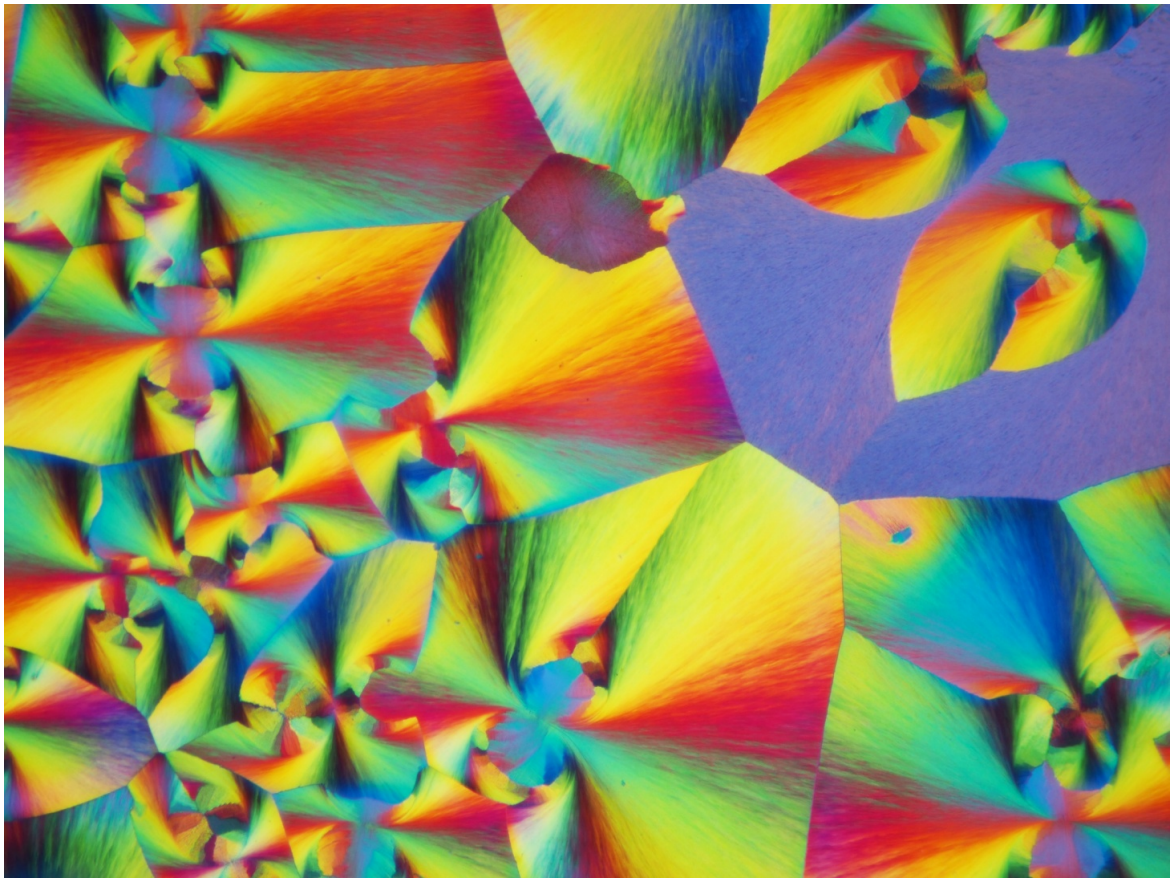


Resorcinol



Tartaric acid & Fertilizer

Paracetamol



Hydroquinone & Tonic

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