Experiment Title: “Crystals and Carbon Nanotubes”

Purpose: To study crystal structures in the presence of carbon nanotubes.

Background/Literature:

- We learned that aspirin will dissolve in isopropyl alcohol (IPA). Aspirin forms crystal when the IPA evaporates. Bigger crystals result from slower evaporation times.
- We obtained a free sample of Multiwalled Carbon Nanotubes from Cheap Tubes, Inc. These CNT are dispersed in IPA.

Procedure:

- Grind aspirin tablets in a mortar and pestle. Dissolve the powder in isopropyl alcohol with and without carbon nanotubes. Observe the resulting crystals under a microscope. http://www.crscientific.com/experiment1.html
- Dissolve monoammonium phosphate NH4H2PO4 crystals in hot water. Add IPA and IPA with CNT. Compare the resulting crystals.

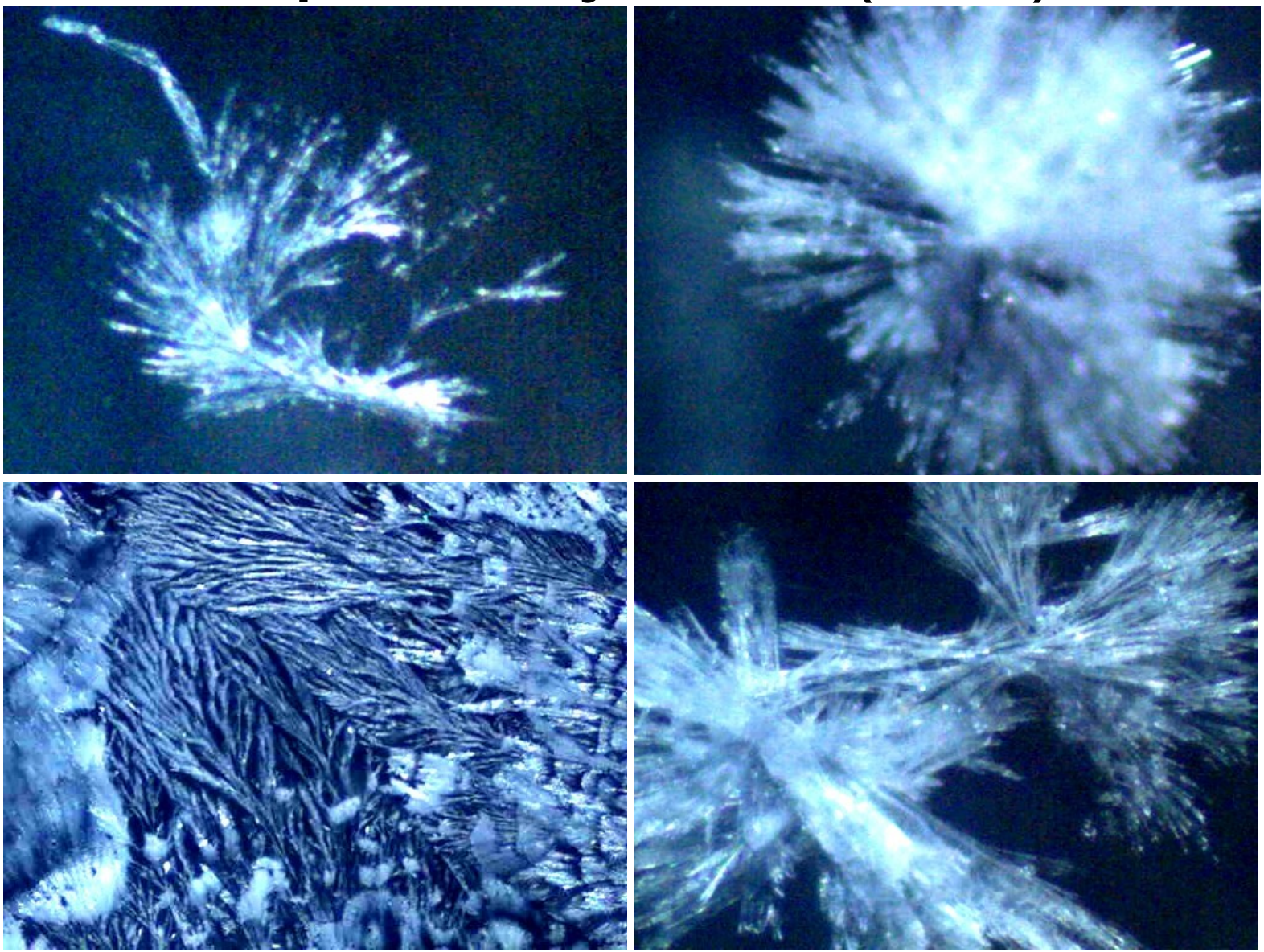
Results:

- The aspirin crystals with carbon nanotubes were bigger and blockier than those without.
- The monoammonium phosphate crystals look similar with and without carbon nanotubes.
- The carbon nanotubes were more evenly dispersed in the monoammonium phosphate solution than in IPA alone.

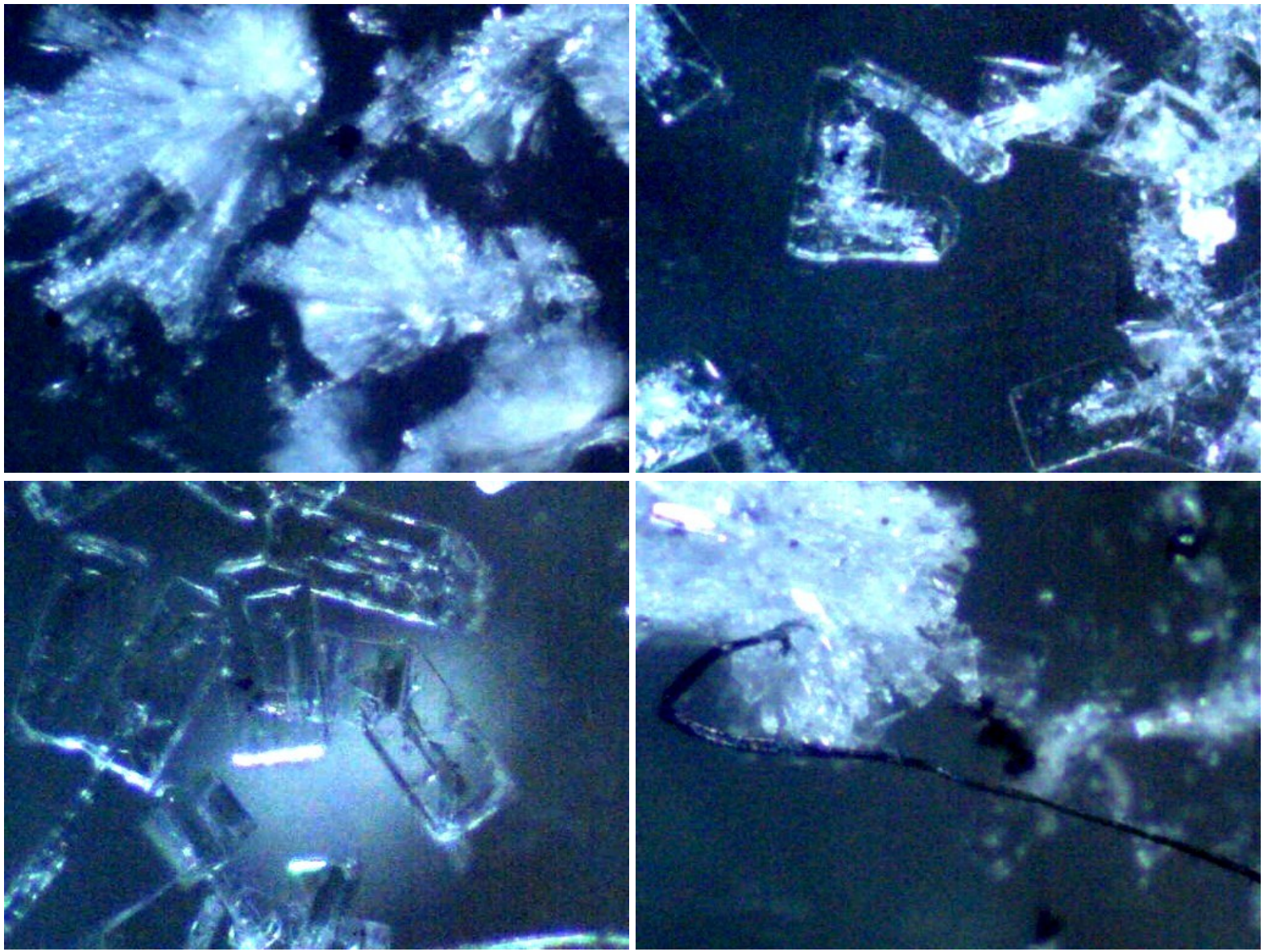
Conclusions:

- While there were differences in the crystal structures formed with and without carbon nanotubes, we were unable to determine whether or not CNT are part of the crystal structure.
- The observation that CNT are more evenly dispersed in monoammonium phosphate could be significant for manufacturing. CNT tend to clump together, and this is a problem for using them in electronics and composites.

Aspirin crystals (IPA)



Aspirin crystals and CNT (IPA)



Aspirin crystals and CNT (IPA)