EDITORIAL

Simple Chemical Experiments 50 Years Ago and Today

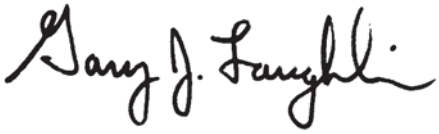
Fifty years ago, in the 25th anniversary issue of *The Microscope*, Walter McCrone proposed some simple chemical experiments using a polarized light microscope (PLM), some glass slides and coverslips, and an alcohol lamp. He believed it might be possible to teach a full curriculum in chemistry using this equipment together with experiments adapted for the microscope. (See "Microscope Past: 50 Years Ago" on page 87). At first, this may seem farfetched, and we may wonder what his motivation was or why it is still important for chemistry students to learn the PLM as an analytical tool or chemical microscopy as the solution to chemical problems today. The answer remains the same.

In the material world, most things of consequence — corrosion, solubility, grain growth and crystallization, melting, abrasion, defects, imperfections, impurities, contaminants, etc. — happen chemically and at a microscopic level, where they are observable with the PLM. Chemical and physical changes can be viewed with this instrument directly in terms of what just happened, with very small amounts of material on a very small scale and at a low cost compared to other methods. Furthermore, when considering industrial processes — product quality and process control, research and development, consumer and customer service problems and complaints — the microscope is there to assist the chemist with a "quick look," telling immediately if a sample is pure, crystalline, amorphous, and sufficient or suitable for further analysis.

Light microscopy can be used to identify thousands of single particles, analyze mixtures, detect polymorphs and determine composition diagrams. Also, most other analytical methodologies such as spectroscopy and chromatography (and even electron microscopy) are restricted to much larger samples. These techniques always benefit from a chemical microscopist who can pick and mount samples ranging in size from one to 10 micron diameters (picogram or nanogram weight) and ready them for analysis.

One would think that microscopes, being the iconic symbol of science in the world, are everywhere in the science laboratories. But this is not the case in schools today — and it wasn't much different 50 years ago. Oh, yes, it is still possible to find microscopes in the usual places. There are schools that teach courses in biological microscopy, mineralogy, clinical microscopy, biomedicine, metallography, and even forensic science, and you will find microscopes in those laboratories, where the emphasis is on biology, minerals, medicine, metals and forensics. But it is rare to find a PLM in a high school or university *chemistry* lab. The student in the chemical sciences today comes out of school unprepared to handle such problems in the real world, because their education lacks microscopy. Chemistry students do not have the benefit of microscopy as a solution to chemical problems, yet chemical problems in research and industry are very common and very broad, and can usually be solved first, if not at least helped, by a chemist properly trained in polarized light microscopy. This was McCrone's mantra.

Sounds like the perfect reason for introducing the microscope to today's chemistry students. Just as McCrone suggested in his article half a century ago, if you are an educator or have developed your own new experiments that are suitable for the classroom and would like to share them with others, please contact us and we'll be happy to make them available to our readers.



Gary J. Laughlin, Editor