

**KÉMIA IDEGEN NYELVEN****FORDÍTÁSRA KIJELÖLT SZAKSZÖVEGEK**

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**What is that white powder?<sup>1</sup>**

With the anthrax attacks that followed the September 2001 terrorist attack in the U.S., the need to identify white powders has risen dramatically. Biologists and chemists naturally think of these methods: culturing, antibody tests, polymerase chain reaction, DNA fingerprinting, atomic absorption spectroscopy and other spectroscopic methods, x-ray analysis, simple chemical tests, etc.

Most of the white powder scares of 2001 and 2002 were the result of deliberate hoaxes, often using common household powders that were alleged to be anthrax spores or some other dangerous material. The actual substances have included wheat flour, confectioner's sugar, granulated sugar, talcum powder, corn starch, powdered coffee creamers, detergents, insecticides and table salt. Given the wide range of chemicals in these samples, it is a no simple problem to identify whether a suspicious white powder is anthrax spores or one of these other substances.

A recent article in *American Laboratory* (April 2003, pages 10-13), by Gary J. Laughlin of the McCrone Research Institute, highlights the special usefulness of the polarized light microscope (PLM) in identifying white powders. The author first notes that white powder analysis, where there is no starting idea of what the powder might be, is not the usual subject of routine chemical, biological, medical or other investigative work. In a drug bust, for example, the white powder is likely to be heroin or cocaine or perhaps a mixture of these with sucrose or starch. Or, a white powder found in the possession of a bombing suspect is likely to be a fuel, an oxidizer or some such material. But a suspicious powder coming out of an envelope – that's another matter.

The PLM is especially well suited to identifying white powders, as Dr. Laughlin indicates in the *American Laboratory* article noted above. Under

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a microscope at 100-to 200-fold magnification and viewed with polarized light, many white powders have clearly different appearances. Thus it is very easy to distinguish' among granulated sugar (sucrose), powdered sugar (sucrose) crystal fragments, corn starch and potato starch. Moreover, physical mixtures can often be separated under the microscope and each component can be examined separately by microscopy.

The publisher of *American Laboratory*, International Scientific Communications, maintains recent articles on its website: <http://www.iscpubs.com/articles/entireal.html>. Look for the article referred to above by its title, "Counterterrorism and the polarized light microscope". There you will find the complete article, including colour pictures showing the clear distinctions that are possible with the PLM.

The use of microscopy in identifying substances was pioneered by Walter McCrone (1916-2002) over more than 50 years. You can learn more about microscopic applications to analytical problems by visiting the McCrone Research Institute website:

[www./mccrone.co/ma/index.html](http://www.mccrone.co/ma/index.html). Look under "Case Studies" for several examples of particular problems solved by microscopic examination.

A related site, [www.mcri.org](http://www.mcri.org), gives a short biography of Dr. McCrone and some of his more famous projects. Among these is a brief introduction to McCrone's analysis of the Shroud of Turin. In his words the Shroud "is a beautiful painting created about 1355 for a new church in need of a pilgrim-attracting relic", not an actual burial shroud from 36 CE. Others, of course, disagree. See, for example, [www.shroud.com/](http://www.shroud.com/), or [sindone.torino.chiesacattolica.it/en/welcome.htm](http://sindone.torino.chiesacattolica.it/en/welcome.htm). [LJB]

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