Primo Levi and *The Periodic Table:* Teaching Chemistry Using a Literary Text

Viktoria Klara Lakatos Osorio, Peter Wilhelm Tiedemann and Paulo Alves Porto*
Instituto de Química – Universidade de São Paulo
Av. Prof. Lineu Prestes, 748, Cidade Universitária 05508-900, São Paulo, SP Brasil; *palporto@iq.usp.br*

Students received part of the chapter “Potassium” of Primo Levi’s book *The Periodic Table (1)*. The adapted excerpt follows:

Now I had to distill [benzene] a second time in the presence of sodium. Sodium is a degenerated metal: it is indeed a metal only in the chemical significance of the word, certainly not in that of everyday language. It is neither rigid nor elastic; rather it is soft like wax; it is not shiny or, better, it is shiny only if preserved with maniacal care, since otherwise it reacts in a few instants with air, covering itself with an ugly rough rind: with even greater rapidity it reacts with water, in which it floats (a metal that floats!), dancing frenetically and developing hydrogen. I ransacked the entrails of the Institute in vain:…I found dozens of labeled ampoules,…but not a sign of sodium. Instead I found a small phial of potassium: potassium is sodium’s twin, so I grabbed it and returned to my hermitage.

I put in the flask of benzene a lump of potassium, “as large as half a pea”—so said the manual—and diligently distilled the contents: toward the end of the operation I dutifully doused the flame, took apart the apparatus, let the small amount of liquid in the flask cool off a bit, and then with a long pointed stick skewered the “half pea” of potassium and lifted it out.

Potassium, as I said, is sodium’s twin, but it reacts with air and water with even greater energy: it is known (and was known also to me) that in contact with water it not only develops hydrogen but also ignites. So I handled my “half pea” like a holy relic: I placed it on a piece of dry filter paper, wrapped it up in it, went down into the Institute’s courtyard, dug out a tiny grave, and buried the little bedeviled corpse. I carefully tamped down the earth above it and went back up to my work.

I took the now empty flask, put it under a faucet, and turned on the water. I heard a rapid thump and from the neck of the flask came a flash of flame directed at the window that was next to the washbasin and the curtains around it caught fire. While I was stumbling around looking for some even primitive means to extinguish it, the panels of the shutter began to blister and the room was now full of smoke. I managed to push over a chair and tear down the curtains; I threw them on the floor and stomped furiously on them…[extinguishing the fire].

[I] returned to the scene of the accident, and found fragments of the flask still on the floor: on one of them, by looking closely, one could see, barely visible, a tiny white fleck. I tested it with phenolphthalein: it was basic, it was potassium hydroxide. The guilty party had been found: adhering to the glass of the flask there must have remained a minuscule particle of potassium, all that was needed to react with the water I had poured in and set fire to the benzene vapors.

The assistant looked at me with an amused, vaguely ironic expression: better not to do than to do…I thought of another moral, more down to earth and concrete, and I believe that every militant chemist can confirm it: that one must distrust the almost-the-same (sodium is almost the same as potassium, but with sodium nothing would have happened), the practically identical, the approximate, the or-even, all surrogates, and all patchwork. The differences can be small, but they can lead to radically different consequences, like a railroad's switch points; the chemist's trade consists in good part in being aware of these differences, knowing them close up, and foreseeing their effects. And not only the chemist's trade. (Levi, Primo. *The Periodic Table,* Raymond Rosenthal transl.; Schocken Books: New York, 1984.)