



## Learning by Accident

*Learning by Accident is an ongoing Crucible feature, in which real-life lab accidents or incidents are recounted and explained. The goal is to highlight the consequence of ignoring safety rules so that science educators will be further encouraged to become knowledgeable, and to take appropriate action, in areas of safety that effect their daily activities in the science classroom. Submissions are encouraged. If requested, anonymity will be guaranteed. Please send written descriptions to Ian Mackellar, STAO Safety Committee Chair, Box 191, MAITLAND, ON K0E 1P0*

### Magnesium Powder Accident

« « « Submitted by a STAO member, Region 1.

In an incident reported recently, a Grade 10 class was heating magnesium powder on a tin lid which was sitting on a wire gauze supported by a ring clamp. The teacher, who was newly qualified, gave a group some more magnesium from the stock bottle, putting it onto an already hot lid. The powder sparked back into the stock bottle and the teacher took it immediately to the front bench. He tried to scoop the burning powder into the sink. When this did not work, he put the bottle into the sink and used water. This also failed, so he then tried a dry powder extinguisher (Class ABC). Probably the force of the jet blew some magnesium powder into the air, where even more ignited, flaring up, burning the teacher's hand, and setting fire to paper in a waste container.

#### Comments from the STAO Safety Committee

There are several lessons to be learned:

- It is questionable whether the students should have been using magnesium powder. If the only purpose of the activity is to show the combustion of magnesium, as an example of a synthesis type reaction, the ribbon is far safer.
- Stock bottles should not be open anywhere near where a reaction is taking place. It is rather like firework safety – you take one firework out of the box, put the lid back on and hide the box out of the way.
- The fire-fighting methods were quite inappropriate. Hot magnesium will react vigorously with steam to

produce hydrogen, which is the last thing you want. A large excess of clean dry sand is an effective way of dealing with metal fires. A 2-litre plastic drink container with the top cut, full of sand is suitable and could be kept on hand, appropriately labeled, whenever reactive metals are to be used. Alternatively, a fire extinguisher with a Class D fire rating, suitable for combustible metal, should be available.

This incident emphasizes the need for science staff, particularly newly qualified teachers, to receive training in emergency procedures. The Occupational Health and Safety Act requires employers (i.e. District School Boards) to provide adequate health and safety training for all employees.



### Recycling old carpets *(...continued from page 21)*

reverse of the equations on previous page). In the presence of ammonia, at this high temperature, adipic acid is converted into adiponitrile, which can later be hydrogenated to form additional hexamethylenediamine. The final phase of the recycling process is separation of the three recovered monomers: adiponitrile, hexamethylenediamine, and caprolactam.

The DuPont technology is currently up and running at the company's

Maitland plant, near Kingston ON, although the separation of the nylon fibers from the backing is presently carried out at a plant in Chattanooga TN, from which the used nylon is shipped to Ontario for reprocessing.

As with so many recycling initiatives, the major stumbling block is the difficulty and the expense of collecting up old carpeting. DuPont has a subsidiary, DuPont Flooring Systems, that installs new carpets, particularly for commercial customers. It is thus

relatively easy for their subsidiary to collect the old carpet as it is removed, and ship it to the parent company for recycling. However, collecting, identifying, and separating used residential carpeting, much of which is set out for curbside garbage pick-up, is a problem that has not yet been solved.

Source of information: Tullo, A.H., *Chemical and Engineering News*, January 24, 2000, pp. 23-24.

