



The University of Hong Kong

SAFETY MATTERS

July 2, 2010

To: Deans, Heads of Departments & DSRs of

- Faculty of Dentistry
- Faculty of Engineering
- Li Ka Shing Faculty of Medicine
- Faculty of Science

Explosion involving a Vessel used in a Hydrothermal Process

Hydrothermal process has become increasingly common in the synthesis of nano-materials in research of various disciplines. The process typically involves the heating of aqueous chemical mixtures in an enclosed metal vessel well above the boiling point of water under self-generated pressure for a prolonged period of time.

An accident happened recently in a local institution where a hydrothermal vessel exploded in a furnace, totally wrecking the furnace and causing significant damages to the surroundings. It was only fortunate that nobody was around when the explosion happened. Had it been otherwise, the accident would have caused serious injuries to anyone in the vicinity.



Scene of Accident

While the accident is still under investigation by the institution involved, it is believed that the explosion could be caused by overheating of the hydrothermal vessel which was not equipped with a safety device (such as a pressure relief valve or rupture disc, etc.).

Please bring this to the attention of your research staff/students who may use similar hydrothermal processes, and make sure that they pay particular attention to the following:

- Hydrothermal vessels with safety devices (such as pressure relief valve or rupture disc, etc.) should be used instead of those without safety devices. They should be purchased from reputable manufacturers with clear certification/specification on the maximum working pressure and temperature. The use of hydrothermal vessels without such certification/ specification poses an unknown risk to the users, and is not acceptable.



A vessel without safety device
(similar to the one involved in the accident)



A vessel with safety device

- Never use hydrothermal vessels under conditions exceeding their maximum working pressure and temperature. Always follow instructions of the manufacturer of the vessel.
- Use an oven with a maximum temperature setting not exceeding the temperature limit of the vessel so as to minimize the risk of gross overheating.
- A Standard Operating Procedure (SOP) for the hydrothermal process should be established in the laboratory. All potential users of the process should be properly trained and should follow the SOP at all times.

If you need further information and assistance on the matter, please do not hesitate to contact the Safety Office.

Dr. Edmund Hau
Director of Safety

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