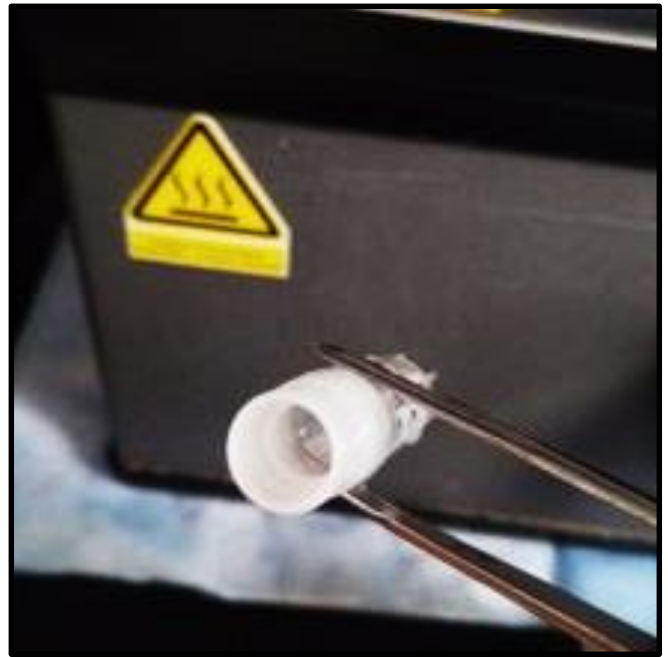


Safety Alert

Exploding Cryogenic Vials

January 2020



Description

Over the past few years several incidents have occurred at other institutions where vials used to store biological samples (e.g. cells) in liquid nitrogen have exploded upon warming causing both physical injury and giving rise to the risk of contamination with a hazardous material. These incidents occur most commonly when vials are stored immersed in liquid nitrogen allowing some nitrogen to seep into the vial. On warming this liquid nitrogen expands nearly 700 times causing the vial to rupture violently. In some cases it has been reported that researchers have suffered burns and in one recent high profile case lost their sight.

Learning Points

- Cryovials should be made of polypropylene rather than polystyrene or glass to reduce the risk of catastrophic failure. It has been reported that explosions are much less likely if cryovials fitted with “male” caps are used.
- Cryovials should be stored in the vapour phase above the liquid nitrogen if possible rather than being immersed in the liquid to avoid liquid nitrogen seeping into the vials. Overcrowding of storage vessels should be avoided.
- All staff who handle cryovials should be made aware of this risk and trained in both general cryogenic safety and in safe thawing techniques. Appropriate PPE including suitable blast resistant face shields should always be worn by anyone working with cryovials (or anyone else in the vicinity who could be at risk).
- Caps should not be overtightened prior to storage to avoid damaging or distorting the rubber o-ring seal in the neck of the vial which increases the risk of liquid nitrogen entering the vial.
- When thawing a cryovial, do so in a thick walled container, biological safety cabinet (or other suitable enclosure) where an explosion can be contained and the risk of injury is reduced. Remember that even the warmth of your hand can cause a vial to fail.