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Title: Species Prone to Thermal Shock and Cracking

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Species Prone to Thermal Shock and Cracking

Native sulphur is so heat sensitive (has a high co-efficient of thermal expansion) that it will suffer spalling if held tightly in the hand, this occurs as the outer part of the crystal expands much more rapidly than the inside. Native sulphur is a fairly common mineral, found in most collections.

Many crystalline minerals contain small cavities partly or wholly filled with liquid, these are called fluid inclusions. In an environment with rapidly changing temperature, for example, turning on display case lights or moving specimens from an unheated store to a warm room, the fluid in these inclusions may expand or contract more severely than the surround mineral, leading to fracturing or even explosive disintegration. Fluorite specimens are particularly prone to fracture damage from fluid inclusions.

Collection workers should be wary of potentially large temperature variations inside showcases used for minerals, traditionally lit very brightly, or where sunlight adds to the thermal gain. Mineral specimens should also be well packed for transportation and allowed time to acclimatise in a new environment before unpacking.

References:

Waller, R Temperature and humidity sensitive mineralogical and petrological specimens pp 25-50 in The care and conservation of geological material minerals, rocks, meteorites and lunar finds, ed Frank Howie, Butterworth Heinemann 1992.

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Frozen Collections and Incorrect Temperature

Increasingly, natural history collections contain frozen material, dead animals and birds awaiting mounting or skin preparation have long been stored in museums, but collections of frozen tissue intended for DNA sampling are becoming more common. Freezer alarms, back-up freezers or alternative power supplies should be in place where maintenance of collections below 0°C is essential. Elderly freezers should be checked regularly, a procedure that prevented a disaster from occurring at Ludlow Museum recently, we have kept the old freezer as a back up to the new one.

Specialist geological institutions may also house frozen material, for example ice cores from glaciers and polar ice sheets and frozen deep-sea soft sediment cores. Specialist low temperature tabs and cold weather clothing for staff are needed to work on these specimens.

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Conservation of Two Frozen Specimens, CMN 56973 and CMN 56974

The Canadian Museum of Nature mineral collection houses two very unusual specimens of native silver collected from a mine in the permafrost of northern Canada. The dendritic silver has grown in a vein of ice within the rock matrix.

Five specimens were originally collected in late 1980s, but despite being flown back to Ottawa in cooler boxes, only two survived the journey. These specimens were bagged and placed in the Mineral Sciences department chest freezer inside a cooler box.

Concern was expressed that over time, condensation would accumulate as frost on the specimens and could slowly become compacted and incorporated into the ice of the original specimens. Analysis of the ice would therefore be contaminated by modern water with the potential of invalidating results.