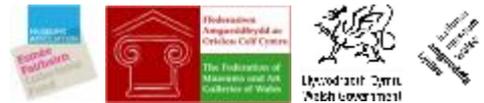


# Care of Fossil, Mineral and Rock Collections



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## 1. Introduction to Fossil, Mineral, and Rocks Collections

Specimens of geological origin may be found not only in geological study collections, but also in archaeological, historic and contemporary collections, for example jewelry. The objects primarily found in geological collections may be organized into three broad categories: fossils, minerals and rocks. All of these geological materials can vary widely in their composition and structure and can be subject to many different types of deterioration depending on their chemistry, state of preservation and the environmental conditions they are subjected to.

## 2. Storage & Display

The preservation of geological collections is not necessarily as straightforward as it may at first appear. Fossils, rocks and minerals may be destroyed completely if stored in incorrect conditions. Correct packaging, storage and display conditions which protect specimens from chemical, and physical damage is the most effective way to minimize risks to collections and ensure their survival.

### 2.1 Collection Assessment

A collection review is a good way of highlighting any potential problems with a collection. It may highlight any objects requiring conservation, identify any specimens lacking

accession numbers and those which require specific environmental conditions or pose health and safety risks. An assessment can be carried out to record information regarding each object including its location, condition and a brief description.

### 2.2 Labels & Information

Maintaining accurate information about specimens is vital for both access and health and safety. Each specimen may be labelled directly using light- and water-resistant ink applied over a removable adhesive layer in an inconspicuous place. If paper labels are used they should be waterproof or resistant to biological growth. Hazard warnings should be marked on any packaging.

## 2.3 Environmental Conditions

Many mineral species, in particular, are extremely sensitive to relative humidity (RH), and should be kept at the appropriate level and without fluctuations for each material concerned. Many minerals are also light-sensitive, and exposure of these to light must be controlled.

## 2.4 Microclimates

The ideal climate for each specimen varies according to its chemical composition, especially for minerals; susceptible specimens must be stored in sealed micro environments. These micro-climates are often the most effective way to buffer environmental changes. They also prevent contamination and can be tailored to suit particular specimens. For example, silica gel may be used to adjust particular relative humidity levels.

If using micro-climates it is important to remember that acids released by some mineral species can build up and become concentrated inside packaging. This may be mitigated through the use of acid buffering materials and chemically inert packaging.

## 2.5 Physical Protection

Polyethylene foam may be used to cover shelves or box bases to avoid damage from vibrations and abrasion/vibration. Ensure that any storage boxes used are strong enough to cope with the weight of heavy specimens and are clearly labelled with weight warnings to avoid them being dropped and causing injuries. The heaviest objects should be stored on the lowest shelves to improve access and also to prevent them being dropped from height.

## 2.6 Shelving

For larger or awkward objects that cannot be housed in individual storage boxes or cabinets, open shelved racking is available. For geological collections heavy duty storage racks should be used.

Shelving may be static or moveable and can be tailored to specific storage needs. Open shelving is less secure than closed cabinets but specimens may be covered using polyethylene

sheeting (Tyvek) to prevent the build-up of dust. Keeping the collection free of dust is important, as dust can attract insects which cause damage to associated items such as labels, and may spread to other vulnerable collections.

Floor loadings in the storage and display areas should also be considered to avoid damage to the building.

## 4. Health & Safety

Specimens may be sharp or very heavy. There are also many rocks and minerals that are toxic, or may release toxic gases. Other minerals may be fibrous or release dust particles, and others could contain radioactive elements. The risks of working with these objects can be minimised through health and safety procedures.

Remember ALL unidentified specimens should be considered to contain unknown compounds and handled carefully and with gloves. Dust masks or respirators should be used when handling dusty minerals or working in dusty conditions and work on these objects should take place in a well-ventilated area. Lab coats or overalls should also be worn to prevent contamination of clothing. If any objects are radioactive or contain asbestos then professional advice should **ALWAYS** be sought before handling. Heavy objects should only be moved by trained staff using correct manual handling techniques or lifting equipment.

## 5. Conservation

In most cases all but the most straightforward conservation intervention should be left to trained conservators. It may be necessary however to dust specimens from time to time if they are not kept in a sealed environment. This can be carried out only on the least fragile objects, with an air puffer or a soft brush taking great care that the cleaning does no damage. If any areas become detach or loosened then the cleaning should be stopped immediately.

## 2.7 References

Brunton, C.H.C., Besterman, T.P., Cooper, J.A. (eds) 1985. *Guidelines for the Curation of Geological Materials*.

Croucher, R., Woolley, A.R. 1982. Fossils, minerals and rocks. Collection and Preservation. British Museum (Natural History) and Cambridge University Press. 60pp.

A large proportion of museum conservation is preventive, including monitoring environmental conditions and ensuring correct storage. RH and temperature monitoring can be carried out using card RH indicators, hygrometers or electronic data loggers which can be placed either in storage boxes and display cases or in storage areas and galleries.

Any particularly sensitive specimens should be monitored on a regular basis to check for signs of decay and action taken to improve their condition if necessary.

## 6. Additional Information

This information sheet was compiled by [Cardiff University Conservation](#) students as part of the Federation of Museums and Art Galleries in Wales project 'Linking Natural Science Collections in Wales', funded by [Esmee Fairbairn Collections Fund](#) and supported by the [Welsh Government's Museums Libraries Archives Division](#) and [Amgueddfa Cymru - National Museum Wales](#). You can find information about the project on the website of the [Federation of Museums and Art Galleries in Wales](#).

This leaflet provides a brief introduction to the subject. If you require detailed advice on the care of museum collections please consult your regional conservator or the Institute of Conservation's [Conservation Register](#).

## Agents of Decay

- § Physical forces
- § Fire
- § Water
- § Criminal
- § Pests
- § Contaminants
- § Light and UV radiation
- § Incorrect temperature
- § Incorrect relative humidity
- § Custodial neglect

**SUPPLIERS:**

Issue	Description	Associated Specimens	Identifying the Problem	Prevention
<b>PYRITE DECAY</b>  <i>Also known as: Pyrite rot or fossil disease.</i>	Pyrite is a shiny yellow mineral ("fool's gold") <i>Causes:</i> Exposure to oxygen and/or high humidity	Igneous/metamorphic/sedimentary rocks Often fine-grained or microcrystalline disseminated through fossils	<ul style="list-style-type: none"> <li>• Yellow and white powdery appearance</li> <li>• Cracking of specimen</li> <li>• Acidic smell (rotten eggs)</li> <li>• Scorch marks on boxes, labels, and drawers</li> </ul>	<ul style="list-style-type: none"> <li>• NO chemical must be applied to protect it</li> <li>• Low relative humidity will inhibit decay: 25-50% (ideally 30%), e.g. microenvironments with silica gel.</li> </ul>
<b>ASBESTOS MINERALS</b>	Inhalation of respirable fibers (in airborne dust) of asbestos minerals can cause asbestosis (lung cancer and mesothelioma)	Strictly the micro-fibrous forms of amphiboles, but there are many asbestiform minerals	<ul style="list-style-type: none"> <li>• Fibrous appearance</li> <li>• Can be red, yellow, green, white or blue</li> <li>• Silky</li> <li>• Will not fluoresce under UV light</li> </ul>	Risks can be reduced by clearly marking and packaging specimens.
<b>TOXIC MINERALS</b>	Most minerals are safe, but some are toxic either by ingestion, inhalation (dust) or skin contact.	Most common: Antimony (Sb), Arsenic (As), Barium (Ba), Bismuth (Bi), Boron (Bo), Copper (Cu), Fluorine (F), Lead (Pb), Mercury (Hg), Selenium (Se), Thallium (Tl), Uranium (U), Zinc (Zn).	Identification should be carried out by a competent mineralogist. If a mineral has a powdery surface, or is sticky, use caution and wear gloves.	Risks can be reduced by clearly marking and packaging specimens.
<b>RADIOACTIVE MINERALS</b>  <i>The collection should be checked using a Geiger Counter.</i>	If more than 6 objects are present in the collection they should be stored separately in a controlled radiation area with adequate ventilation.	Radioactive specimens may be associated with a number of other mineral species and it is advisable to check igneous and metamorphic minerals routinely before registering them.	Always read labels, and any associated records. Use a Geiger counter.	Risks can be reduced by clearly marking and packaging specimens. If the collection holds radioactive specimens, you may need to contact a Radiation Protection Advisor.

**FURTHER ADVICE**

If you notice something which you are unsure about, please contact a specialist conservator or curator for advice.

**If you cannot find help locally, contact:**

- § The Institute of Conservation (UK): [www.icon.org.uk](http://www.icon.org.uk)
- § The Geological Curators Group (UK): [www.geocurator.org](http://www.geocurator.org)
- § The Natural Sciences Collections Association (UK): [www.natsca.org](http://www.natsca.org)

**PROFESSIONAL ORGANIZATIONS:**

- § The Institute of Conservation (UK): [www.icon.org.uk](http://www.icon.org.uk)
- § The Natural Sciences Collections Association (UK): [www.natsca.org](http://www.natsca.org)
- § The Geological Curators Group (UK): [www.geocurator.org](http://www.geocurator.org)
- § The Paleontological Association (UK): [www.palass.org](http://www.palass.org)
- § The Geological Society (UK): [www.geolsoc.org.uk](http://www.geolsoc.org.uk)
- § The Institutes of Materials Minerals, and Mining (UK): [www.iom3.org](http://www.iom3.org)

- § Escal™: [www.csconserv.co.uk](http://www.csconserv.co.uk)
- § Plastazote: [www.ramfoam.com](http://www.ramfoam.com)
- § Stewart Boxes: StewartPlastics - [www.stewart-solutions.co.uk](http://www.stewart-solutions.co.uk)
- § Geiger Counters: <http://www.pce-instruments.com/>
- § Conservation by Design: [www.conservation-by-design.co.uk](http://www.conservation-by-design.co.uk)
- § Conservation Resources Ltd (UK): [www.conservation-resources.co.uk](http://www.conservation-resources.co.uk)
- § Preservation Equipment, Ltd: [www.preservationequipment.com](http://www.preservationequipment.com)