

Mitigation of the effects of pollutant gases on susceptible objects.

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Out-gassing from the materials used in the display and storage of museum collections have been shown to cause the corrosion of metals and the formation of mixed salts on porous materials such as limestone, marble and low fired ceramics. The gases considered to be of most importance are acetic and formic acid, possibly formaldehyde and acetaldehyde, and the reduced sulphur gases hydrogen sulphide and carbonyl sulphide. When building new showcases or new stores the main approach to mitigation of out-gassing is to screen the materials planned for the construction and only use materials which do not give off corrosive gases. This is the approach used in the British Museum.

However there are situations where materials which out-gas have to be accepted. These include the reuse of existing showcases, historic buildings where wood showcases and structures are part of the building, out-gassing from the objects and potentially harmful gases adsorbed onto the surface of objects. In a building which does not have a pollutant gas filtered air handling system the ambient reduced sulphur gases are always present.

Despite years of new gallery developments all of these situations are encountered in the British Museum. Several mitigation strategies have or are being used to reduce the effect of corrosive gases on objects. Sealing wood using either a barrier film or a lacquer to reduce the level of out-gassing has been in use for 15 years. The passive and active deployment of adsorbents for reduced sulphur gases has been trialled for the protection of silver objects from tarnishing. A general adsorbent material, activated carbon in granular form or as a cloth, has been used for 7 years in wood showcases to reduce the internal levels of acetic and formic acids. Low relative humidity levels reduce the rate of emissions from materials and objects and the rate of reaction at object surfaces.

These strategies have been used to solve the problems which arose with the display of silver in non air conditioned

galleries and during the development of the Kings Library as the Enlightenment gallery. The Kings Library is the grandest gallery in the Museum and contains all of the original wood cases which had to be used for the display of 5000 objects from the collections. The results of research into the effectiveness of the different strategies in laboratory experiments and in the Museum galleries will be presented.