



Smithsonian Center for Materials Research and Education

Topics in Conservation Science Lecture



Enzymatic and Non-Enzymatic Degradation of Fungal Melanin

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Molds and various blue-staining wood fungi infest many art objects, especially when the objects are improperly stored in high-humidity environments. Molds produce the black pigment melanin (an organic polymer that is found in spores, embedded within hyphal cell walls, and even found extracellularly), which causes stains on or in the objects. Even if such an infestation is eradicated, melanin remains attached to or entangled with the surfaces that were previously overgrown by the fungus. Melanin is an extremely recalcitrant polymer and cannot be removed from the art by classical conservation techniques. Nor can aggressive and non-specific oxidants be used, as such agents can themselves cause significant damage to the art.

This research concluded that biomimetic melanin stain bleaching is a very promising way to tackle this problem. However, the technique needs to be refined before it is used in conservation.

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