NATURAL HISTORY MUSEUM

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Utilising dewetting to remove "insoluble" resin coatings

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Introduction

Dewetting is a process of film rupture which can occur at a solid–liquid, solid-solid or liquid–liquid interface. The process of dewetting occurs by the nucleation and growth of randomly formed holes and undulations, which coalesce to form a network of polygonal cracks, before breaking into droplets which enter solution. The process requires application of a microemulsion with a detergent, which causes swelling of a polymer coating and reduces glass transition temperature, making polymer chains more mobile and creating bubbles below the resin layer, in turn increasing the surface area available for interaction.

This technique has recently been pioneered in the conservation of works of art on paper for the removal of usually "insoluble" coatings and is reported to take 5 mins to 2 hours to take effect.

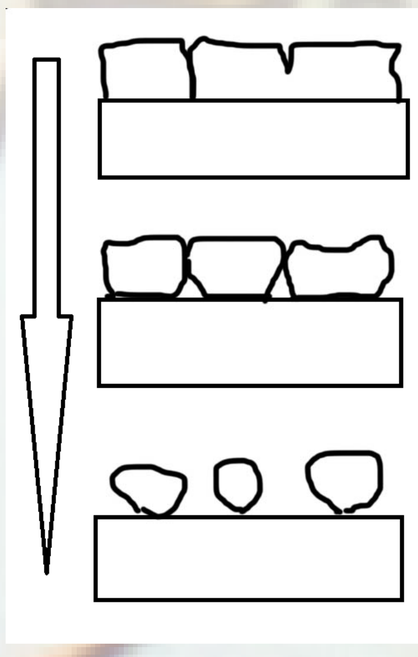
Frequently epoxy coatings have been applied to fossils to enhance their appearance, but this can interfere with scientific analysis and it can become desirable to reverse them. This poster documents an experiment where a dewetting formula is applied to epoxy resins on rock substrates. The aim is to test the applicability of this technique within geological conservation.

Method

Two epoxies (Araldite 2020 and Htxal Nyl-1) were painted onto a small selection of sedimentary rocks and allowed to cure for 3 weeks. The dewetting mixture was then applied using a brush and allowed to work for up to 1 hour before swabbing with water.

Recipe

- 10% MEK (aka 2-Butanone or Ethyl methyl ketone) in water
- 1% Ecosurf EH-6 (2 Ethyl Hexanol)
- Methyl cellulose gel
- Apply to surface, cover with polyethylene sheet
- Check after 5 mins, then 20 mins, etc



Results

Even after 24 hours very little had happened. A slight bloom (microscopic bubbles) had appeared on the Araldite and the Hxtal had developed some microscopic crazing at the edges and at a few nucleation points.

The treatment was completely underwhelming and not worth pursuing for conservation of geological materials.

References

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