A dissolvable support jacket for preparation of thin arthrodire and shark specimens from the Upper Devonian Cleveland and Bedford Shales utilizing Carbowax 4000

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Abstract

Complete preparation of large arthrodire and shark specimens that are thin and delicate, and entirely embedded in a hard, non-collapsible matrix can be difficult; particularly if the goal is to use the end cut for acid preparation. This is where Carbowax can be used to support the specimen during acid preparation or for final cleaning. Carbowax is a family of polyethylene glycols that are water soluble. A dissolvable support jacket is constructed first by embedding the specimen and Carbowax 4000 is applied directly to the prepared and sealed surface. The size and thickness of the jacket will vary depending on the fossil. After the acid has been added, the jacket can be flipped and the remaining matrix removed. An added advantage is that Carbowax 4000 is that after preparation is completed, the wax can be retrieved by dissolving in a warm water bath and subsequent decantation. Setting up the support jacket is easy requiring both a dissolvable jacket with a material that remains intact during acid preparation and non-dissolvable wax that can be applied. Below is a step-by-step guide for the dissolvable wax procedure.

Retaining wax

After the fossil is securely extended in the city, position the dissolving wax next to the fossil. If this wax is thick, you may need to cut the fossil a bit from the base. Clay will be used to secure the wax and setting wax such as petroleum jelly as a release agent for the Carbowax, otherwise the wax will not completely fall off of the specimen. It effective is resulted. Be careful not to get petroleum jelly on the fossil surface.

After Specimen is Prepared

Wax the specimen has been completely prepared, and before removing from the base, you may need to prepare small cracks with thin wax, and if necessary cut the entire surface, depending on the presence or stability of the fossil. Larger cracks or gaps can be filled with plaster or another filler you desire to support. Below: Carbowax 4000 large, this shows plates from unidentified arthrodires.

Removal of Wax From Fossil

After the fossil has been completely prepared, and stabilized by your own technique, you can remove it from the wax. Place the specimen in a container, with enough warm water to cover it. If you choose, you can save away a substantial amount of wax beforehand, being careful to save the salvaged for recycling. This will minimize the amount of time the specimen is inverted. In the case of two nested elements, it’s sometimes advisable to leave a certain amount of wax to maintain their mutual orientation. You may want to dissolve the wax by putting into boiling water, or boiling or deglazing in water, these should be approached with care. Below: Carbowax 4000 right upper jaw of Cleveland arthrodire with anterior and attached.

Wax can be removed after acid preparation is complete. If wax has been dissolving, and the fossil safely removed, you can isolate the Carbowax by pouring the wax with the dissolved wax into a small candle jar. Set it aside until all the water has evaporated. This will leave a film of wax in the bottom of the pan. Bring a small bottle, rotate the wax and break it up. Mix the wax together with suitable flux, and rotate the wax by breaking it up. You may find that the clay and petroleum jelly has dissolved the wax, but this does not mean it negatively affects the properties for future use in this procedure. However, it’s important to get as much of the wax out as possible.

Pouring Wax – Above: CMNH 52223 right lower jaw of Donecathch shark with an unstoppable dissolving wax field.

Wax the surface of the fossil with a hair dryer before pouring the wax. This will allow the wax to sit upon the surface, thereby avoid damage the fossil. Carbowax 4000 completely cools already, you should pour about working time before it solidifies. The wax is thick, so it’s important to make the color gradients, i.e., not too thin this side. The amount of wax not vary with dissolved specimens. Mark the internal side of the wax with a marker, and then choose a reaction point on the location you’ve marked. This location will be the final location of the finished wax.

Waxing Base And Clay Overlay – Above CMNH 52223 unidentified arthrodire anterior arm.

Choose a base... (in this case wax), appropriate to the size of the specimens, shaping enough wax to overlap the fossil. The wax will be the base for a second layer, a gauze or clay overlay. Otherwise, heat from the wax will cook the clay to the base. Alumina dust is preferable to the wax, but wax will work for the city or your paper, and is troubleshooting to remove.

Fitting the clay or gauze, keep in mind the size of the fossil, begin laying enough room for the weight of wax. Lay off the alumina over the dissipating wax. Always brush the base and the clay on the base, removing any excess water. Leave the surface of this clay base by cutting out the depression in the shape of the fossil, as in setting up a mold; completely washing the sager, leaving only the previously prepared surface exposed.

Use Production During Preparation Process

During the course of preparation heat may be generated from at least two different sources, rendering and cutting work. The temperature with fatty Carbowax 4000 may negatively affect the integrity of the jacket, so it’s important to make it thick enough.

Materials

Wax, or all of the materials will be already be part of most well-stocked preparation lab, or are readily available:

Carbowax 4000 (Polyethylene glycol) 70% petroleum jelly, 30%

Clay Base (bond or other material) and, if necessary:

Double boiler, consisting of pot, 12x18” oil beaker, and ring stand set-up.

Brown for applying petroleum jelly

City working tools

Thickener or flux

Some material for creating retaining walls

Waxing tape

Insulated needle thermometer

Hair dryer

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