

Ebonizing and Liming - John Cameron

Oak is a difficult wood to turn – has a tendency for tear out and if green, turning oak rapidly rusts the surface of the lathe. Although oak's patterns are distinctive, its color is somewhat dull. Techniques that are especially applicable to oak are ebonizing followed by liming. There is considerable interest in both ebonizing and liming, but limited information. Here, I explain my methods for both ebonizing and liming.

First let's consider why these techniques are especially applicable to oak. Ebonizing is turning the wood black through a chemical reaction between the tannins in the wood and iron acetate. Hardwoods contain more tannins than do softwoods and dark hardwoods contain more than do the lighter hardwoods. For ebonizing, the chestnuts, cherries and oaks are preferred to the aspens, maples and birches. Liming is the addition a white color material into the wood's pores. This technique works well on ring porous woods such as oak, hickory, elm and chestnut – where the distinctive ring pattern is emphasized, but not on diffuse porous woods such as maple, birch, or walnut – where the wood simply look dirty. Since oak is extremely common in Southwest Michigan, and meets the above requirements, it is an ideal candidate for these techniques. More specifics on these techniques follow.

Ebonizing: Since ebonizing is caused by a chemical reaction between the tannins in the wood and iron acetate, it is not the same as dyeing. The difference is that the black color is stabilized in the wood and will not bleed into the liming pigments. If you used a dye instead of ebonizing, the dye will tend to run into the liming pigments. To prevent this, the wood needs to be lightly coated before liming.

Iron Acetate – where to find it: Don't go out to the drug or hardware store for iron acetate. It's expensive and hard to find, but can easily be made.

Materials Needed: Vinegar, Steelwood, Coffee Filters and Storage Jars



To make iron acetate, react about half a small pad of fine steel wool with a few cups of vinegar. Since the reaction of vinegar (acetic acid) and iron generates hydrogen, only slightly seal the reaction jar and only limited reagents. You don't want the jar to explode because of the buildup of pressure nor do you want the room to fill with hydrogen. To be on the safe side, I sometimes place the jar outside in a shed, although in the winter time this wouldn't be feasible since the reaction is slowed by low temperatures. The reaction usually needs from 3 days to about a week. After 3 days, you can test the solution on a piece of oak to see the effect. If you want a darker color, let the reaction precede a longer. In the picture below you can see that the reaction is happening from the formation of the small bubbles of hydrogen in the jar.

Reaction with the Formation of Hydrogen



If the steelwool and vinegar don't react, it is likely because the steelwool that was used is coated with oil. To correct this, you need to wash the steelwool with soap before reacting with the vinegar.

After the desired level of iron acetate is reached, the solution is filtered (use a simple coffee filter-one that isn't bonded) and stored in a container. To ensure that all the iron has been removed and the reaction is complete, I only slightly seal the container for the first few weeks and watch for any hydrogen bubbles.

One variable that limits the darkness that is achieved is the level of tannin in the woods. As mentioned in the introduction, oaks should have enough tannin, but it will vary. One method to increase the tannin level is to coat the wood with a strong solution of tea. Heat 6 or more small tea bags in a quart of water and then apply this solution to the wood before treating it with the iron acetate. Let the tea solution almost dry before applying the iron acetate.

Liming:

Preparing the Wood for Liming: My ebonizing procedure consists of the following, 1) Turn the wood to the desired shape – vessel, bowl, peppermill, etc., 2) Sand to 320 grit, 3) open the pores using a brass brush, 4) moisten the wood and re-sand starting with 320 and ending with 1200, 5) vacuum the pores, 6) apply the iron acetate, 7) apply liming wax, 8) wipe off with an oxidized walnut finish, 9) let dry and coat with wipe-on polyurethane. Let's discuss these steps.

Turn the wood to the desired shape: Here, it is important that no tool marks or tear-outs are visible. The liming process emphasizes any imperfections in the finished piece. Therefore, the piece needs to be as clean as possible.

Sand to 320: I like to perform most of the sanding starting with 80 and quickly working up through all the levels to 320. Sanding with 80 is quite rapid and I don't like to miss any tool marks and have them show up in the finished piece.

Open the pores: Liming shows up much better if all the pores are completely open. This is accomplished using a brass brush and brushing in the grain direction. I buy the brushes at Harbor Freight (\$2 for a set of brass, plastic and steel brushes).

Moisten the wood and after drying re-sand from 320 to 1200: Because the ebonizing solution is water based, it will raise the wood's grain and result in a rough finish. Therefore, you need to rewet the wood and re-sand. I like 1200 as the final sanding since it provides a nice surface.

Vacuum the wood: You need to remove any dust that remains from the last sanding.

Apply the iron acetate: Wipe on the iron acetate and let dry. If you want a darker color you might apply it again. Better yet, test your solution on a scrap piece of wood and if the color is not dark enough apply the tea solution to the wood before the iron acetate.

Cover the wood with the liming solution: Apply the wax as you would polishing your shoes or car. I use Briwax Liming Wax, which is available from most turning suppliers or on Ebay. Some people use white shoe polish or some other white material such a wall board top coating. However, I have always been concerned about what is in these materials and believe that a wax specially made for this purpose is safer.

Wipe off the excess wax: After liming, you need to wipe off the excess liming wax using an oil or wax coated rag. I use oxidized walnut oil, since this will try to a hard finish and can be recoated. You can wipe the liming wax off with another clear wax, but you probably will not be able to recoat the wood. To avoid this, some turners will apply a coating such as wipe-on poly before applying the liming wax, wipe-off with another wax and not recoat. Don't worry about the precoating plugging the pores and preventing the liming wax from entering the pores; the pores generally remain open. This process works but the liming wax is more likely to transfer into anything the piece contacts.

Finish coating: The walnut oil has dried; I coat the piece with wipe-on poly to provide permanent protection.

Liming Wax and Oxidized Walnut Oil



Filtering Iron Acetate

