

Thermal Knowledge

What can torrefaction do for your instrument?

BY DANA BOURGEOIS

Q *We love the sound of vintage guitars, improved over the years by chemical changes inside the wood, vibrational energy, UV exposure, changes in humidity, and so on. From observing violins, we know that the aging process continues to improve (or at least not degrade) tonal quality for up to 350 or 400 years. To what approximate “age” does the torrefaction process take wood, and how do you think modern guitars made using torrefied wood will react to those changes 40 or 50 years from now?*

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A Torrefaction is a process of heating wood in an oxygen-free environment to remove oils, pitch, sugars, resins, and other vibration-damping volatiles. It’s believed that proper treatment redistributes lignin, the “glue” that bonds cellulose fibers, resulting in wood that is measurably stiffer, weighs less, and vibrates more efficiently than un-torrefied wood. Under a microscope, torrefied wood looks much like wood that was naturally cured for many decades.

True torrefaction—the elimination of volatiles without damaging structural cellulose—occurs within a range of temperature and duration of treatment that varies from one wood species to the next. The window for optimum treatment is relatively narrow, but within it, different degrees of aging can be simulated. I’ve experimented with torrefied woods that appear to simulate between 50 and 100 years of natural aging. My objective is to get as close as possible to the sound of guitars from the ’30s and ’40s, so I’m mostly attracted to wood in the upper half of that range.

Large chemical and structural changes occur in the first few years after a tree is cut. After a couple decades, however, natural transformation slows considerably. The condition of wooden objects found in Egyptian tombs

suggests that curing attributable to aging alone eventually operates at an extremely slow rate, at least under ideal conditions.

Given that violins from the 17th century are still in active service, and that guitars from the 1930s still sound good enough to exchange for extremely large sums, it seems reasonable that contemporary guitars made with torrefied wood can last for at least the lifetime of the original owner—and hopefully a lot longer. The oldest torrefied guitars I’m aware of were produced more than 20 years ago by several Scandinavian luthiers. From what I have been able to learn, the structural condition of those guitars appears about normal for their age.

Length of fiber is one indication of structural integrity. If you break a quarter-inch by quarter-inch stick of properly torrefied Adirondack spruce and observe the length of fibers at the break, on average these will be longer than fibers from broken sticks of non-torrefied Western red cedar, redwood, Engelmann spruce, and Alpine spruce—all species commonly used for contemporary steel-string guitars.

My takeaway is that properly torrefied, properly selected wood used in conjunction with a well-engineered design, can produce guitars that are both great-sounding and durable. Though they may not turn up in Egyptian tombs, every indication is that 40 or 50 years from now, high-quality, well-maintained, torrefied guitars stand a solid chance of becoming vintage in their own right.

Dana Bourgeois is a master luthier and the founder of Bourgeois Guitars in Lewiston, Maine.

GOT A QUESTION?

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