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Testimony to the California Air Resources Board

Composite Wood ATCM

My name is Kaichang Li. I am an associate professor in the Department of Wood Science and Engineering at Oregon State University. I am the inventor of the adhesive technology used for making PureBond plywood. I invented the adhesive technology through mimicking marine organism mussels. Mussels stick to rock, wood, and other substances strongly in seawater to cope with turbulent tides and waves through producing adhesive protein. Mussel adhesive protein is a strong and water-resistant adhesive, but is not readily available. Soybean contains a high amount of protein. But wood composite panels bonded with soy-based adhesives suffer from low strength and low water-resistance. Using mussel adhesive protein as a model, I was able to invent an environmentally friendly soy-based adhesive from abundant, renewable, and readily available soy flour. Wood composite panels bonded with our adhesive have excellent strength properties and excellent water resistance. Our soy-based adhesive is able to bond virtually all woody materials. It doesn't matter whether these woody materials are in the forms of veneer, particles or fibers. For example, our soy-based adhesive can bond pine to pine very well while urea-formaldehyde resins cannot. Our soy-based adhesive is a very robust and versatile adhesive technology.

After I invented the adhesive technology about five years ago, I disclosed the adhesive technology at professional meetings, and approached wood adhesive manufacturers and some wood composite manufacturers, trying to commercialize it. Columbia Forest Products was the only company at that time that was interested in this novel adhesive technology and took efforts to commercialize it.

I still remember what my department head told me about three years ago when we had successful application of our soy-based adhesive in a mill scale. He said we would be very lucky if our adhesive technology could hold the technology advantage for five years. He was absolutely right. In less than three years, many wood composites panels bonded with other formaldehyde-free adhesives from different companies already flood the market. This tells you how fast the adhesive technology can be advanced and how well the wood composite industry can respond CARB's potential regulation on formaldehyde emission.