Chemical engineer develops styrene-free bio-renewable resins

July 14 2020, by Patricia Mroczek

PhD student Harshal Bambhania is helping develop new styrene-free bio renewable resins. Credit: Michigan State University

Research at Michigan State University is developing new styrene-free bio renewable resins with broad applicability in the construction of

countertops, bathroom fixtures, windmill blades, and boats.

The research is from the team of John Dorgan, the Lamp Endowed Chair Professor of Chemical Engineering and Materials Science.

Dorgan's third-year graduate student Harshal Bambhania took the team's research to Marblecraft, a marble manufacturing company in Fowlerville, near East Lansing, earlier this year to cast a prototype of a "Drop-in-bowl" to modernize vanity and kitchen counters.

Bambhania said the prototype is more resource renewable than current products made of petroleum-based polyester dissolved in styrene.

"Presently, unsaturated polyester resins are used extensively in fiberglass composites for boat building, kitchen and bathroom countertops, and sinks from cultured stone," he explained. "However, there is a growing awareness that styrene has several shortcomings. It is not based on renewable resources, is a volatile organic compound, and indicated as a potential human carcinogen."

To overcome these limitations, the Dorgan research group including Bambhania; post-doc Bin Tan; and two former students at the Colorado School of Mines—Christopher Moran and Dylan Cousin—developed a bio renewable resin system formulated using poly(lactide) (PLA) and methyl methacrylate.

"Preliminary calculations show a 40 percent reduction in greenhouse gas emissions (CO_2 equivalent) compared to current technologies," Bambhania said.

Work on the project is continuing this summer. Bambhania said various mechanical tests, including tensile properties and the Rockwell hardness test, along with environmental testing (scratch and stain test, hot/cold

water-resistance, etc.) will be conducted according to the appropriate ASTM standards.

Dorgan noted that research on Sustainable Sinks and Countertops is often done remotely from MSU's St. Andrews in Midland. The ability to do MSU research at the Midland campus is as innovative as the research itself, he said.

Provided by Michigan State University

Citation: Chemical engineer develops styrene-free bio-renewable resins (2020, July 14) retrieved 3 May 2024 from
https://phys.org/news/2020-07-chemical-styrene-free-bio-renewable-resins.html