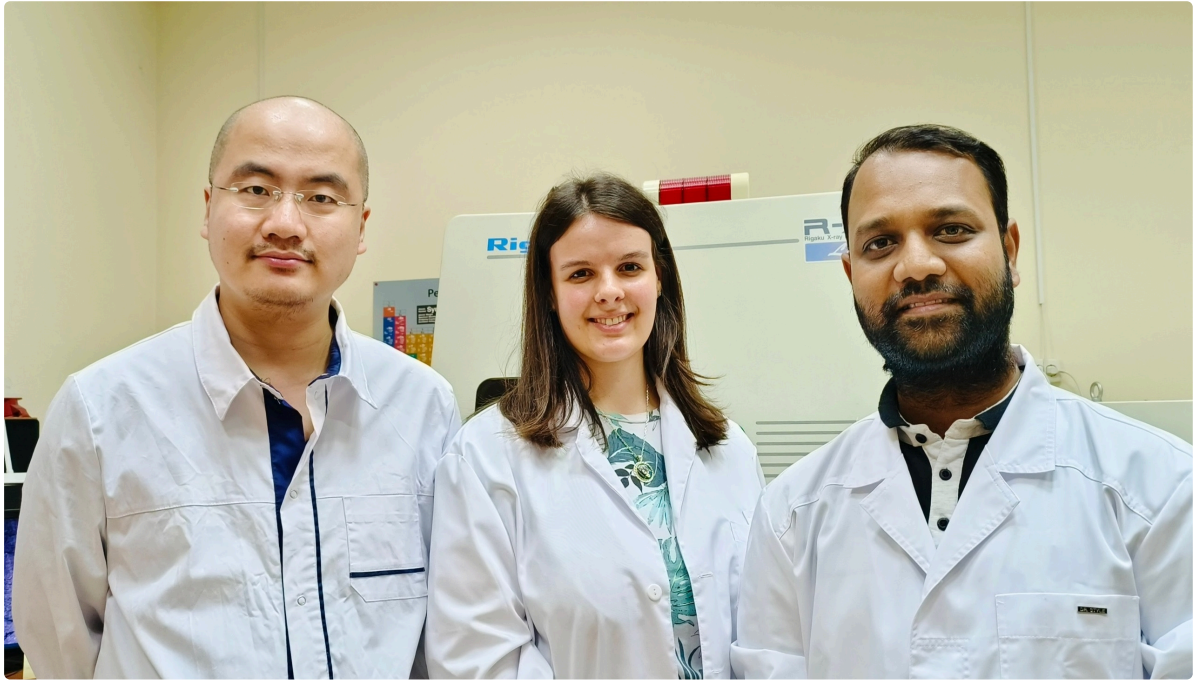


Scientists Develop Innovative Roofing Coating to Combat Heat and Moisture Challenges



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Researchers at Southern Federal University (SFedU), in collaboration with scientists from India and Egypt, have unveiled a groundbreaking roofing coating designed to protect against moisture damage, rain, and solar radiation effects. The coating offers exceptional thermal insulation, potentially reducing energy consumption for maintaining comfortable indoor temperatures.

Urban areas often face elevated temperatures compared to rural regions due to the absorption of near-infrared solar radiation. According to SFedU's International Research Institute for Smart Materials, multiple buildings exacerbate this issue by creating a "trap" for sunlight, with shiny metal roofs being particularly effective heat absorbers.

Metal roofs present numerous challenges: they are prone to rust in humid conditions, fail to insulate indoor spaces effectively, and struggle to maintain stable indoor temperatures. These limitations drive increased reliance on energy-intensive heating and cooling systems.

To address these issues, the SFedU-led team developed a composite coating for metal roofs using bismuth, vanadium, and zirconium compounds ($\text{BiVO}_4/\text{ZrO}_2$). This innovative material reflects over 50% of the sun's rays in the near-infrared range, reducing roof surface heating and keeping internal roof temperatures up to 12 degrees cooler. The findings were recently published in the *New Journal of Chemistry*.

"This material not only reduces urban heat but also enhances the durability of roofs by slowing iron oxidation, thereby preventing rust," said Dr. Aslam Hossain, Senior Researcher at SFedU's International Youth Laboratory for Green Smart Nanomaterials. He added that the composite could lower maintenance costs and extend the lifespan of roofs.

The development aligns with SFedU's strategic project under the federal *Priority-2030* program, focused on creating sustainable materials for a low-carbon economy. Researchers are now working to further enhance the coating's reflective properties and plan large-scale experiments on real buildings.

SFedU's innovative efforts highlight the potential for advanced materials to mitigate environmental challenges and improve urban living conditions while promoting sustainability.

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