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IIT-I develops lead-free thermochromic perovskites

TIMES NEWS NETWORK

Indore: The Indian Institute of Technology (IIT) Indore developed environmentally friendly lead-free thermochromic perovskite material for thermochromic applications, which are widely used in smart wearables, temperature indicators, and medical devices. The alternative to traditional lead-based perovskites addresses the basic challenges of thermochromic material such as slow response times, poor stability, and environmental toxicity.

Thermochromism is the ability to change colour in response to temperature variations, and this characteristic has vast applications in smart wearables, temperature indicators, medical devices, architectural designs, and defence technology.

Professor Suhas Joshi, director of IIT Indore, said, "The development of lead-free thermochromic perovskites marks a major advancement in material science, as these non-toxic alternatives have the potential to revolutionise future technologies. By understanding the principles of thermochromism, researchers are paving the way for safer and more efficient materials that could impact various fields, from healthcare to climate-responsive architecture."

The research is led by Professor Preeti A Bhobe, department of physics, IIT-I, and PhD student Bikash Ranjan Sahoo. Perovskites are a special class of material found both in nature and synthesised in laboratories and gained immense research attention due to their remarkable optical and electronic properties, said researchers. Bhobe said, "We achieved this using a cost-effective solvothermal method under controlled cooling conditions. These newly developed crystals exhibit a remarkable and reversible colour change—from yellow at low temperatures (-173°C) to brown at higher temperatures (about 200°C)."