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IIT researchers make device for energy storage & heat control

TIMES NEWS NETWORK

Indore: Researchers at the Indian Institute of Technology (IIT) Indore developed a path-breaking technology that could change the future of energy storage, providing immense use for industries working on the electronification of gadgets and vehicles. The team, led by Prof Rajesh Kumar from the Materials and Device (MAD) Lab of the Physics Department, created a revolutionary colour-modulating supercapacitor that not only stores energy but also shows its charging status through visible colour changes while blocking infrared heat, an IIT release said.

Prof Rajesh Kumar said, "Our technology combines energy storage, heat control, and visual feedback in one compact device, offering users a smarter, more efficient way to manage energy. It has the potential to transform multiple sectors, from consumer electronics to electric vehicles." Prof Kumar said this technology will be of immense use for industries working on the electronification of gadgets and vehicles. With small design changes, the same platform can also be used to create electrochromic batteries.

This innovation has great potential for industries such as automotive, where electrochromic applications are growing rapidly. The technology can also help in smart buildings by filtering heat and reducing cooling costs while remaining transparent. In electric vehicles, it can improve energy efficiency through better thermal management and energy storage. This electrochromic supercapacitor visually indicates its charge level — red when fully charged, green when half charged, and blue when fully discharged, the IIT release said, adding this simple, real-time colour feedback removes the need for separate monitoring circuits and allows users to know the device's energy status instantly. The colour change is made possible through the electrochromic properties of a specially designed vanadium oxide complex that changes its optical characteristics during charging and discharging. In addition to storing energy, the device actively blocks infrared heat by adjusting its heat-blocking ability with small electric currents. TNN

The prototype showed excellent performance, achieving optical modulation of up to 70% at red colour and 50% at blue colour