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Welcome to NewsEffect – May 2024

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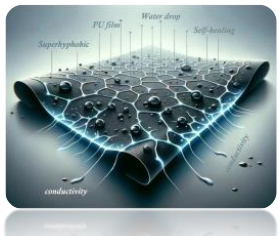
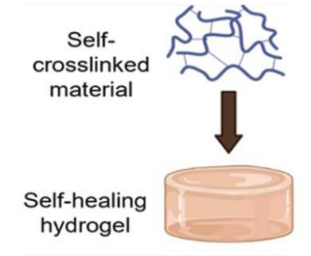
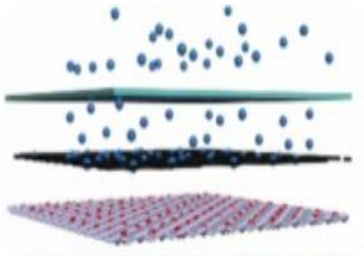
Self Healing Polymer

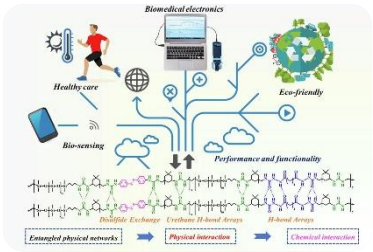


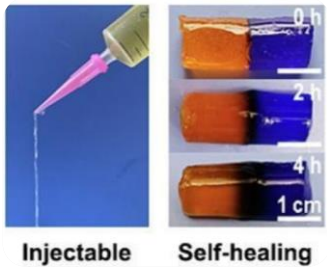
- Apple is patenting a 'self-healing' screen on iPhones that fold In The patent doesn't describe what Apple would use for its self-healing layer other than "a polymer or any other desired material having self-healing properties." A new Apple patent offers something slightly less spectacular, describing a foldable iPhone with a "self-healing" layer on the screen that will automatically fill in dents or other bruises. The patent for Electronic Devices with Flexible Display Cover Layers shows us what Apple may be trying to do to really help any potential foldable iPhone stand out. Like other foldables, this device would have a hinge and a flexible display cover layer. These displays on phones such as the Samsung Galaxy Flip and Fold 5, the Pixel Fold, or the OnePlus Open are thinner than what you'll usually find on a flagship phone, allowing them to flex. This also causes them to be far more susceptible to bumps or scratches. Apple, for its part, shares a few details about how the phone could have a "self-healing material" coating on top of the screen that "may fill the dent even without external intervention..
- What fire ants can teach us about making better, self-healing materials. Fire ants form rafts to survive flooding, but how do those bonds work? And what can we learn from them? A Binghamton University, State University of New York professor is researching those questions to expand our knowledge of materials science. In their most recent publication in the Proceedings of the National Academy of Sciences, Wagner and his co-authors at University of Colorado investigated how fire ant rafts responded to mechanical load when stretched, and they compared the response of these rafts to dynamic, self-healing polymers.
- Superior strength, highly stretchable, bionic self-healing polyurethane and its composites for flexible conductivity and self-cleaning applications. Researchers prepared Self-healing polyurethane composites with a hierarchical hydrogen bonding structure. Inspired by natural spider silk and cartilage, multiple dynamic hydrogen bonds were introduced into the pre-prepared polyurethane (PU). Then modified graphene oxide (GO) nanosheets with dynamic hydrogen bonds were added into the prepared PU to form composites (AU-PU/GDU) to establish a dense hydrogen bond network structure, providing strong interfacial interactions. The surface of polyurethane coated with modified nanoparticles showing superhydrophobicity and electrical conductivity. The composite film has excellent tensile strength, high stretchability.
- Photothermal-responsive lignin-based polyurethane with mechanically robust, fast self-healing, solid-state plasticity and shape-memory performance. Researchers from China developed a photothermal-responsive lignin-based polyurethane, incorporating lignin and oxime-carbamate bonds into a polyurethane network. The resulting polyurethane, with a dynamic cross-linked structure and abundant hydrogen bonds, exhibits remarkable mechanical strength (30.2 MPa) and toughness (118.7 MJ·m−3). Under near-infrared irradiation, the polyurethane demonstrates efficient self-healing, solid-state plasticity, and shape-memory performance (70 s). It achieves self-healing efficiencies of 96.0 % for tensile strength and 96.3 % for elongation at break. This innovation not only addresses the depletion of petrochemical resources and environmental concerns but also showcases the high-value utilization of lignin in sustainable and multifunctional materials.

Self Healing Polymer (Contd.)





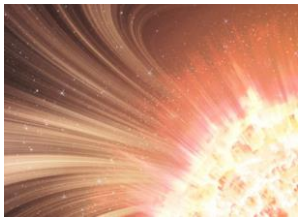




- Exploring self-crosslinked hydrogel: Carboxymethyl chitosan and oxidized alginate for wound healing applications Researchers from India developed self-healing hydrogels composed of carboxymethyl chitosan and oxidized alginate, with a focus on wound healing applications. Oxidized alginate, synthesized via metaperiodate oxidation, was characterized, and hydrogels were formulated using Schiff base reactions. Various evaluations, including gelation, pH, self-healing capability, conductivity, and injectability, were conducted. The optimized hydrogel exhibited superior properties and demonstrated antibacterial activity, cytotoxicity, hemocompatibility, and in vitro wound healing efficacy. In vivo studies further validated its potential for tissue engineering applications.
- Self-repairing thermoplastic polyurethane-based triboelectric nanogenerator with molybdenum disulfide charge-trapping for advanced wearable devices Korea researchers developed a novel self-healable thermoplastic polyurethane (TPU) for a triboelectric nanogenerator (TENG) that harmonizes self-healing efficacy with mechanical durability. Utilizing a unique electrospinning technique, they engineered TPU fibers that not only exhibit remarkable elasticity—withstanding over 600% strain—but also possess the capability to self-repair at just 80 ºC. This robust TENG sets a precedent for self-healing materials in sustainable energy devices and marks a substantial advance towards their integration into everyday wearables. The culmination of these features highlights the potential mass application of TENGs, paving the way for their ubiquitous adoption in the near future. The study advances triboelectric nanogenerators in wearables, showcasing robustness and cost-efficiency.
- Spider silk-inspired supramolecular polydimethylsiloxane network with prominent mechanical robustness for bifunctional flexible electronics a self-healing and recyclable polymer elastomers, inspired by spider silk, was developed using adipic dihydrazide bearing two hydrazide groups to create multiple hydrogen bonding sites between polymer chains. The resulting polydimethylsiloxane exhibited high tensile strength (6.44 ± 0.24 MPa), remarkable toughness (37.00 ± 0.85 MJ m−3), superior elastic restorability, outstanding self-healing capability (approximately 86%), and the ability to be recycled multiple times. These properties are attributed to the synergistic effect of multiple hydrogen bonds and dynamic disulfide bonds. These properties could be adjusted by varying the ratio of adipic dihydrazide. Moreover, the supramolecular polydimethylsiloxane showed promise in the fabrication of flexible bifunctional sensors with excellent sensing properties.
- Biodegradable chitin nanofiber-alginate dialdehyde hydrogel: An injectable, self-healing scaffold for anti-tumor drug delivery Researchers developed a new type of self-healing hydrogel based on natural polymers is created using dynamic covalent bonds. These injectable hydrogels are formed by incorporating alginate aldehyde to create Schiff base bonds with chitin nanofibers. They exhibit outstanding self-healing properties, injectability, and pH-responsive sol-gel transition behavior, making them ideal carriers for encapsulating drugs like doxorubicin (DOX) for delivery. Moreover, these hydrogels demonstrate excellent biocompatibility and degradability both in vitro and in vivo. Also, the sustained release of DOX from the hydrogels effectively suppresses tumor growth in animal models.

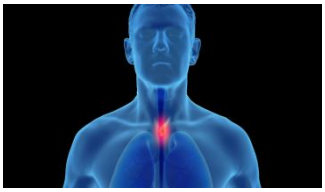
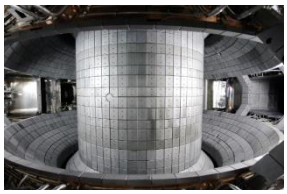
Disruptive Technology Leads





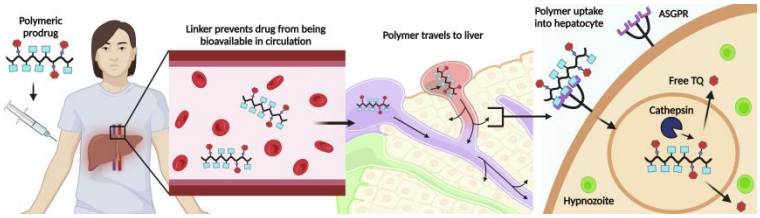

- China's BYD launched the latest version of a plug-in hybrid technology that improves fuel and cost savings, intensifying competition with the likes of Toyota and Volkswagen that still sell mainly gasoline cars. BYD's chairman Wang Chuanfu unveiled the fifth generation of the hybrid technology that achieves a record low fuel consumption of 2.9 litres per 100 km (62.1 miles) on depleted batteries at an event in Shaanxi province's capital Xian. With a fully charged battery and a full gasoline tank, the technology can ensure a driving range of 2,100 kilometers, Wang said in the city where the company's first automaking factory was located.
- IIT-Madras Develops Algorithm to Safeguard Air Traffic Control, Power Distribution against Attacks. Researchers at the Indian Institute of Technology (IIT) Madras have devised a revolutionary algorithm-based technique to alleviate interruptions in vital networks like air traffic control and electricity distribution during a targeted attack. This strategy was put to the test on two infrastructure networks —air traffic and power distribution. The research was peer-reviewed and published in 'Physica A: Statistical Mechanics and its Applications', an international journal.
- The Argonne National Laboratory's Aurora supercomputer has officially passed the exascale computing barrier. Developed by Intel and Hewlett Packard Enterprise (HPE), Aurora's exascale achievement marks a significant milestone for the supercomputer's development. In the latest submission to the semi-annual list of the world's most powerful supercomputers, announced at the ISC High Performance 2024 conference in Hamburg, Germany, Aurora was shown to perform over a quintillion calculations per second. Surpassing the exascale threshold highlights Aurora's enormous potential to boost an array of scientific research fields. Susan Coghlan, Argonne Leadership Computing Facility (ALCF) project director for Aurora, explained: "Hitting exascale is a huge milestone, but enabling groundbreaking science is the ultimate goal.
- New machine learning technique can accurately detect microplastics Optical analysis and machine learning techniques can now readily detect microplastics in marine and freshwater environments using inexpensive porous metal substrates. Techniques for detecting microplastics in water samples are essential for environmental monitoring but challenging, in part because microplastics resemble natural organic compounds derived from biofilms, algae, and decaying organic matter. Existing detection methods generally require complex separation techniques that are time-consuming and costly. The machine learning technique, developed by researchers at Nagoya University with collaborators at the National Institute for Materials Sciences in Japan, overcomes these barriers.
- Solar Orbiter mission unveils solar wind mystery. In a significant scientific milestone, researchers have inched closer to unravelling the enigmatic origins of the 'slow' solar wind. Thanks to data collected during the Solar Orbiter spacecraft's initial close pass by the Sun, this new research provides groundbreaking insights into the formation of the solar wind, a phenomenon that has intrigued scientists for decades. Despite extensive observations over the years, the precise sources and mechanisms that propel solar wind plasma away from the Sun have remained elusive, particularly for the slower variant. Launched in 2020 by the European Space Agency (ESA) with support from NASA, the Solar Orbiter mission aims to demystify these processes.
- Novel reactor system converts carbon dioxide into methane fuelA new reactor design converts CO2 emissions from small boilers into methane fuel, offering a promising approach to combating climate change. Researchers are exploring alternative approaches to mitigating the environmental impact of CO2 emissions from boilers – one approach is to capture the CO2 emitted from these systems and convert it into a useful product, such as methane.

Disruptive Technology Leads (Contd.)


- Ontario Scientists Develop AI Algorithm for Identifying Rare Disorders in Children Researchers at the Children's Hospital of Eastern Ontario (CHEO) Research Institute have developed ThinkRare, a groundbreaking AI algorithm designed to accurately identify rare genetic disorders in children. This innovation can significantly expedite the diagnosis process and ensure timely care for families. The algorithm examines thousands of patient records to detect undiagnosed conditions, facilitating referrals to specialized clinics. Though still in the research phase, ThinkRare has already proven its effectiveness, as demonstrated by Antony, a child diagnosed with the rare Chung-Jansen Syndrome. Ivan Terekhov, one of ThinkRare's main developers, expressed enthusiasm about the project's success, emphasizing its potential to revolutionize pediatric healthcare diagnostics.
- NASA Unveils Revolutionary Infrared Cameras for Earth and Space Exploration NASA has introduced innovative high-resolution infrared cameras with lightweight filters that can study sunlight reflections from Earth's upper atmosphere and surface, improve wildfire warnings, and analyze the molecular composition of other planets. Developed at NASA's Goddard Space Flight Center with Internal Research and Development (IRAD) funding, these cameras use advanced strained-layer superlattice sensors. Their compact and low-mass design allows for greater adaptability and efficiency, benefiting smaller satellites and diverse scientific missions. Engineer Murzy Jhabvala led the sensor's development and highlighted the success of the Compact Thermal Imager on the ISS, which captured over 15 million infrared images. These sensors provide superior resolution and wavelength accuracy, significantly improving data on wildfires, cloud structures, and atmospheric phenomena. The sensors' ability to measure surface heat and pollution will be further enhanced with new six-band versions for projects like G-LiHT.
- Samba TV Unveils Innovative Generative AI for Video Advertising at NewFronts Samba TV has launched its new generative AI technology, Samba AI™, at the NewFronts event, demonstrating its ability to enhance video advertising with actionable insights. This advanced technology provides real-time analysis, including facial recognition, product identification, sentiment analysis, and brand safety detection. Freddie Liversedge from HP illustrated its use in evaluating HP's sponsorship with Real Madrid. CEO Ashwin Navin highlighted that Samba AI represents a significant advancement in TV data, enabling advertisers to create precise targeting segments and improve campaign measurement through contextual insights. This technology aims to elevate creativity and relevance in advertising.
- Aurora Supercomputer Achieves Exascale Computing Milestone. Navitas The Aurora supercomputer at Argonne National Laboratory has successfully surpassed the exascale computing threshold, demonstrating its capability to perform more than a quintillion calculations per second. This achievement, developed in collaboration with Intel and Hewlett Packard Enterprise (HPE), signifies a major advancement in supercomputing technology. The announcement was made during the ISC High Performance 2024 conference, placing Aurora among the world's leading supercomputers. Its state-of-the-art architecture, powered by a vast number of graphics processing units (GPUs), positions Aurora to significantly impact scientific research, especially in areas such as climate science, energy, and AI-driven studies. The supercomputer's remarkable speed and AI capabilities are expected to accelerate research and foster innovation globally.

Disruptive Technology Leads (Contd.)



- Borophene's Chirality: A New Frontier in Implantable Technology Researchers at Penn State have unlocked the potential of borophene by introducing chirality, a concept that could revolutionize implantable medical devices and advanced sensors. This groundbreaking study explores borophene's biological interactions, offering unique possibilities in medical imaging, drug delivery, and beyond. The research, led by Dipanjan Pan, marks a significant step in understanding and utilizing borophene's remarkable properties, paving the way for transformative applications in healthcare and sustainable energy.
- StoreDot and Polestar Introduce Revolutionary 10-Minute EV Charging Technology StoreDot and Polestar have unveiled a groundbreaking achievement in the electric vehicle (EV) industry by successfully charging a 77kWh battery pack in just 10 minutes using StoreDot's fast-charging silicon-dominant battery cells. This milestone, demonstrated in a fully drivable Polestar 5 prototype, showcases the potential to revolutionize EV ownership by addressing charging anxiety and making EVs more accessible and practical for consumers. StoreDot's extreme fast-charging (XFC) technology marks a significant advancement, setting the stage for future breakthroughs in EV charging speed and convenience.
- INZMO Launches AI-Powered RentalBot to Support Tenants and Landlords INZMO, a leading Berlin insurtech catering to the European rental industry, has introduced RentalBot, an AI-driven legal chatbot. The chatbot aims to provide tailored legal information and support to tenants and landlords navigating Germany's rental market. While RentalBot offers valuable expert assistance on common issues related to housing laws and disputes, it does not replace personalized advice from human lawyers. The service is available on a pay-per-consult basis, emphasizing affordability and accessibility for users

Advancement in AI



- Barracuda introduces new AI Assistant for the Barracuda Partner Portal. Barracuda Networks, Inc., a trusted partner and leading provider of cloud-first security solutions, today announced the addition of an innovative new artificial intelligence (AI) assistant to the Barracuda Partner Portal, bringing partners powerful search and enablement capabilities. Barracuda AI Assistant will enhance the partner experience and ease-of-use of the partner portal, and it will help partners save time and improve productivity. This addition makes Barracuda one of the first security vendors to harness the capabilities of AI within a partner portal to provide this level of support.
- Nvidia plans new AI chips every year after logging over $14 bn in profits. American chip maker Nvidia would likely make new artificial intelligence chips every year instead of once every two years. According to a report by The Verge, during the company's Q1 earnings call, Nvidia CEO Jensen Huang said that there is another chip which is currently under the works and the company is on a "one-year rhythm".
- Microsoft Fabric gets new generative AI tech, more openness. Microsoft unveiled new features for Fabric, including an AI assistant in Power BI, real-time analytics capabilities and support for Apache Iceberg.
- GreenNode Joins Forces with Nvidia and Global Partners to Advance Generative AI Capabilities Across Asia Pacific GreenNode, a member of VNG Digital Business, has emerged as a key player in AI Cloud and driving Generative AI advancements across Asia Pacific. Leveraging cutting-edge Nvidia technology, GreenNode has unveiled significant innovations in AI cloud, generative AI chatbots and Stable Diffusion applications, marking a pivotal moment in the region's AI development.
- Elon Musk Plans To Revolutionize AI With Supercomputer. Elon Musk is setting his sights on the AI world, planning a supercomputer that could drastically outperform current technology. Set to be operational by fall 2025, this supercomputer could form a partnership with Oracle and is expected to incorporate Nvidia's H100 GPUs. These advanced units dominate the AI data center chip market, but their high demand suggests supply challenges. xAI's ambitions are clear: to rival AI giants like Microsoft-backed OpenAI and Google, with Musk leveraging lessons from co-founding OpenAI. Training Grok's latest model already required around 20,000 H100 GPUs, and future iterations like Grok 3 will need a staggering 100,000, marking a substantial leap in resource needs.
- Exploring the AI impact on biotech advancements. Bioprocess optimisation involves the use of advanced technologies, including AI and robotics, to enhance the speed, efficiency and accuracy of biological processes such as cell culture, high throughput screening, and genomics analysis and prediction – using autonomous guided vehicles (AGVs) including waste transportation, operation and storage robots and dual-arm composite lab robots. This can improve outcomes in biotechnological applications. Dr. Zhavoronkov explains how combining AI with robotics allows greater levels of speed, efficiency, and accuracy.
- ITW exclusive: SmartCIC Technologies launches innovation hub to propel AI advancements.. SmartCIC Technologies, a subsidiary of SmartCIC Global Services, has inaugurated an innovation hub in Barcelona to enhance its development of cellular performance and Artificial Intelligence (AI) technologies.

IP News

- Future iPhones might self-heal any scratches on the display, thanks to Apple's latest patent. Apple has patented a new display technology that can self-repair, potentially transforming the future of foldable devices. This innovation uses a self-healing layer to automatically fix screen damage. The patent, called "Electronic Devices with Flexible Display Cover Layers," reveals Apple's idea for a foldable screen that can repair itself from scratches and dents. This was detailed in US patent 11991901, which Apple recently secured and was spotted by Patently Apple.
- WIPO Member States Adopt Historic New Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge. WIPO member states today approved a groundbreaking new Treaty related to intellectual property (IP), genetic resources and associated traditional knowledge, marking a historic breakthrough that capped decades of negotiations. This is the first WIPO Treaty to address the interface between intellectual property, genetic resources and traditional knowledge and the first WIPO Treaty to include provisions specifically for Indigenous Peoples as well as local communities. The Treaty, once it enters into force with 15 contracting parties, will establish in international law a new disclosure requirement for patent applicants whose inventions are based on genetic resources and/or associated traditional knowledge.
- Alpha Motor Corporation Receives Patent Allowance for the REX Electric SUV. IRVINE, Calif., May 28, 2024 /PRNewswire/ -- Alpha Motor Corporation is pleased to announce the latest patent allowance for its REX Electric SUV. This milestone builds upon the company's electric light-duty vehicle line up, including the WOLF Electric Truck and JAX Electric Crossover. Receiving the patent allowance for the REX Electric SUV underscores Alpha's commitment to accelerating the transition to electric vehicles.
- USPTO Adapts to CAFC's New Guidelines: What Design Patent Examiners Need to Know. On May 22, 2024, the day after the Federal Circuit's en banc LKQ v. GM decision, the USPTO issued a memorandum to its examiners providing updated guidance and examination instructions in light of the court's overturning of the long-standing Rosen-Durling test for determining obviousness of design patents. The memo, signed by USPTO Director Kathi Vidal, aims to immediately align USPTO practices with the more flexible approach outlined by the Federal Circuit, which eliminated the rigid requirements that: (1) a primary reference be "basically the same" as the claimed design, and (2) secondary references be "so related" to the primary reference that features in one would suggest application to the other. This is a major shift in examination practice for design patents so it will be important to watch the developments to see whether the office ramps up design examination..
- Yamaha Electric Motocross Bike Revealed In Patent Images. Yamaha seems to be getting ready to launch its electric motocross bike, and latest patent filings reveal details of the machine suggesting that its close to being production ready. Now, Yamaha already has an electric trials bike called the TY-E, but there are several changes in the electric motocross bike which has been shown in the patent images. The electric motocross bike is different in several ways than the electric trials bike, and it uses some clever tech to make it suitable for motocross usage. The electric motocross bike is also likely to use a waterproof battery, motor and transmission considering motocross use is likely to expose the bike to water. And to release any condensation from the components while being used in water or mud,

IP News (Contd.)

- Moderna wins Covid vaccine patent case in ongoing Pfizer, BioNTech battle MODERNA has won the latest round of its long-running legal battle with Pfizer and its German partner BioNTech over its Covid vaccine. The European Patent Office (EPO) has upheld the validity of one of Moderna's patents for its Spikevax vaccine, which the firm says Pfizer and BioNTech copied to develop its Comirnaty vaccine. Patent EP949 involves technological advances in messenger RNA (mRNA) technology which Moderna says it pioneered and patented between 2010 and 2016. Moderna began the dispute by filing two infringement lawsuits in US and German courts in 2022, and has launched similar complaints in Dutch, Belgian, and Irish courts.
- Mahindra XUV.e8 Confirmed To Get Three Screens, revealed by its recent Interior Patents Mahindra is gearing up for the launch of its all-new electric version of the XUV700. This new model will be called the XUV.e8, and recently, more details about this electric SUV have emerged. This information comes from the recently patented interior design of this SUV. These patents confirm that the XUV.e8 will feature a three-screen setup and a two-spoke steering wheel. The XUV.e8 is scheduled to make its official debut in December 2024. According to reports by Autocar India, the new patents have revealed that the XUV.e8's interior will boast three individual screens. They will be housed in a single casing that spans the entire width of the dashboard. These screens will include a digital driver's display, a central infotainment screen, and an additional passenger screen. All of these three screens will be running on Mahindra's Adrenox software. Currently, the XUV700 comes equipped with two 10.25-inch connected screens.
- Rail Vision Received Notice of Allowance for US Patent on AI-Powered Railway Obstacle Detection System Rail Vision Ltd. (Nasdaq: RVSN) (the "Company"), a technology company at the forefront of revolutionizing railway safety and the data-related market, today announced that it has received a notice of allowance from the United States Patent and Trademark Office for its innovative AI-based railway obstacle detection system. This patent outlines an advanced method for enhancing rail safety through the use of electro-optical imaging technologies combined with artificial intelligence. The system is designed to significantly reduce collisions on railroads by employing an artificial intelligence model that includes comprehensive scene analysis and image processing techniques.
- CET and IIT Madras Secure Patent for Novel Voltage Device The Indian Institute of Technology Madras (IIT Madras) and the College of Engineering Thiruvananthapuram (CET) have made big steps forward in electrical measurement technology by getting a patent for a new device that measures voltage without touching it. This new invention is a major step forward in the field of electrical engineering. The Indian Patent Office awarded the patent to a project labeled "An instrumentation system with a fully non-intrusive probe for AC voltage measurement."Boby George, who is Head of the Department of Medical Sciences and Technology at IIT Madras. The patented device accurately measures AC voltage without having to remove the insulation from live wires, which is different from other methods that need to be in direct touch with the electrical system. A sensor tool, a measurement unit, a processor, and a display unit make up the main parts of this system.

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