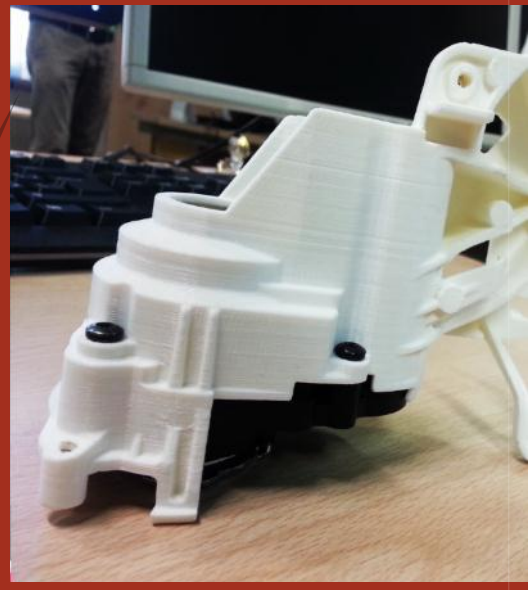
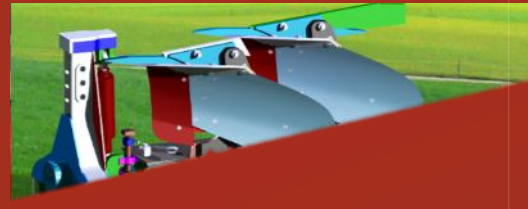
November

2018

DAuto Newsletter





Edition 2018

DAuto Newsletter 111th Edition

Design engineers turn designs into reality. Without them, a great idea but nothing more than,... well, a great idea.

October 2018 refresh

- *New material, manufacturing process use sun's heat for cheaper renewable electricity*
- *The Statue of Unity to be inaugurated on 31st Oct. 2018*
- *Kia Confirms New Compact Crossover For U.S. Market, "Maybe Small Pickup Truck"*
- *ENGIE and STOA to jointly develop 2 GW of wind energy in India*
- *Global Megaprojects: Hudson Yards*
- *Mitsubishi Corporation to acquire 25% stake in Bangladesh LNG receiving Terminal*
- *Volkswagen Developing Jeep Renegade Rival in America, for America*

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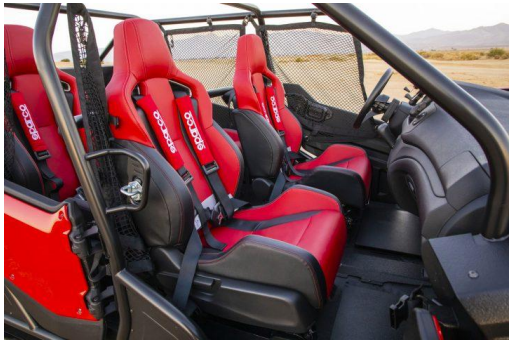
Honda Rugged Open Air Vehicle Concept

Presented at the 2018 SEMA show, the Rugged Open Air Vehicle Concept is Honda's vision of the ultimate off-road four-wheeled vehicle.

Designed and developed by Honda R&D Americas, the concept car combines the utility of the Honda Ridgeline with the off-road ruggedness and extreme styling of the Honda Pioneer 1000 side-by-side.

The Rugged Open Air Vehicle is a working concept, and uses existing Honda components, such as modified Ridgeline body and suspension, along with production Pioneer doors and custom designed bed and tailgate panels modeled after the Pioneer.

The Ridgeline-based interior has been modified for being exposed to the outdoors and features a Pioneer 1000 steering wheel adapted to the Ridgeline steering column, along with Civic Type R seats reskinned in waterproof Pioneer 1000 material, smartphone holders from RAM Mounts, and durable paint-on surfaces to protect the exposed instrument panel from the elements.



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Custom-built 2JetZ futuristic hot rod set to become a Hot Wheels official die-cast model

Luis Rodriguez and his 2JetZ custom car was the the winner of the Hot Wheels Legends Tour, a 15-stop tour that scoured the nation in search of a custom car worthy of being made into a 1:64 die-cast toy.

The tour – at its first edition – was launched in celebration of the brand's 50th anniversary.

Rodriguez's 2JetZ, an open-wheeled jet car, was chosen from more than 3,600 custom cars entered in the Legends Tour and selected for its originality and arresting design.

The announcement was made at the 2018 SEMA Show in Las Vegas, where all 15 finalist cars are on display alongside Hot Wheels' fleet of life-size vehicles.

The 2JetZ design is inspired by a fighter plane in honor of American veterans and its lines are also inspired by the Face Peeler design by concept designer Dwayne Vance.

With more than 600 horsepower and a driver's seat in the middle of the vehicle, the car is crafted with a focus on high-performance and high-end design.

A team of judges, including Hot Wheels designers and automotive influencers, chose the Legends Tour winner for its authenticity, originality and garage spirit. The final team of judges included Jay Leno host of Jay Leno's Garage; YouTube influencer Tanner Fox; legendary Hot Wheels car designer Larry Wood; and car enthusiast Magnus Walker, among others.

"Hot Wheels has crowned me as a winner, and I get the chance to represent some of the most creative and beautiful designs that I've seen," said Luis Rodriguez. "With my car, I wanted to create something from scratch that tested my ability as a builder and I am happy that the 2JetZ has taken me on this journey."

The Legends Tour winner's life-size car and die-cast version will be inducted into the Hot Wheels Garage of Legends, a collection of one-of-a-kind cars immortalized as Hot Wheels die-casts that meet the brand's high standards of style and performance.

"All our Legends finalists on display at SEMA are winners — each custom build embodies originality, authenticity and the garage spirit," said Chris Down, SVP & General Manager, Hot Wheels. "The 2JetZ looks like it performs and everything about it was built from the ground up. Its forward design aesthetic will add variety to the Hot Wheels line and is a car that both adult fans and kids will love."

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Low cost, energy-saving radiative cooling system ready for real-world applications

University of Colorado Boulder and University of Wyoming engineers have successfully scaled up an innovative water-cooling system capable of providing continuous day-and-night radiative cooling for structures. The advance could increase the efficiency of power generation plants in summer and lead to more efficient, environmentally-friendly temperature control for homes, businesses, utilities and industries.

"We can now apply these materials on building roof tops, and even build large-scale water cooling systems like this one with significant advantages over the conventional air conditioning systems, which require high amounts of electricity to function," said Associate Professor Gang Tan of the University of Wyoming's Department of Civil and Architectural Engineering.

The new research demonstrates how the low-cost hybrid organic-inorganic radiative cooling metamaterial, which debuted in 2017, can be scaled into a roughly 140-square-foot array -- small enough to fit on most rooftops -- and act as a kind of natural air conditioner with almost no consumption of electricity.
"You could place these panels on the roof of a single-family home and satisfy its cooling requirements," said Dongliang Zhao, lead author of the study and a postdoctoral researcher in CU Boulder's Department of Mechanical Engineering.
The findings are described today in the journal Joule and take advantage of natural radiative cooling principles.

"As Earth's temperature warms due to the absorbed heat from the sunlight during the day, it continuously emits infrared light to the cold universe all the time," said Professor Ronggui Yang of Mechanical Engineering and lead author of the study. "During the night, Earth cools down due to the emission without the sunshine."
The researchers' film-like material reflects incoming almost all sunlight while still allowing an object's stored heat to escape as much as possible, keeping it cooler than ambient air even in the midday sun.

"The material, which we can now produce at low cost using the current roll-to-roll manufacturing techniques, offers significant advantages." said Associate Professor Xiaobo Yin of Mechanical Engineering and CU Boulder's Materials Science and Engineering Program.

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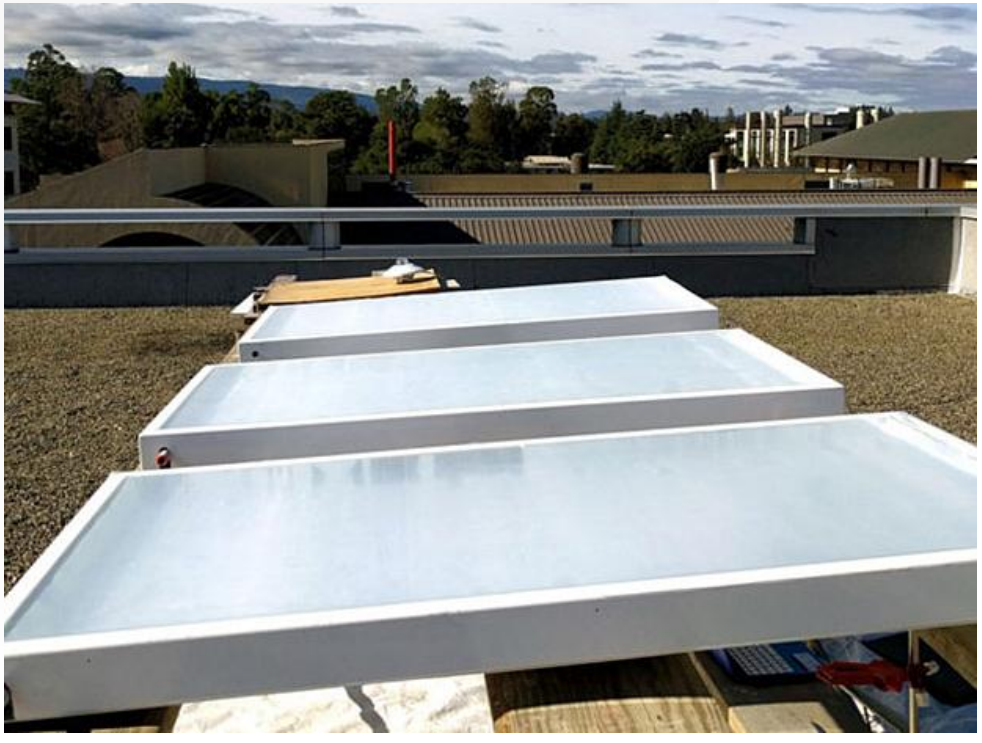
Low cost, energy-saving radiative cooling system ready for real-world applications



The researchers tested their system outdoors in a variety of weather conditions, including wind, precipitation and humidity. In experiments conducted in August and September 2017, their proprietary RadiCold module kept a container of water covered by the metamaterial 20 degrees Fahrenheit cooler than the ambient air between 12:30 p.m. and 3 p.m., the most intense summer sunlight of the day.

The researchers also introduced an element of dynamic scheduling to their technology, anticipating that structures such as offices may have limited or no cooling demand at night. In a building-integrated system, however, a cold storage unit could be added to capture the cold through heat transfer fluid such as water in this system and allow it to be retrieved during the subsequent day to reduce the cooling strain during peak demand periods.

"We have built a module that performs in real-world, practical situations," said Yang. "We have moved quite far and fast from a materials level to a system level.“

The RadiCold module could become a viable solution for supplemental cooling for single-family homes, businesses, power plants, municipal utilities and data center facilities among other potential applications, Yang said.

Additional co-authors of the study include CU Boulder graduate students Ablimit Aili and Yao Zhai as well as senior undergraduate students Jiatao Lu and Dillon Kidd of Mechanical Engineering. The U.S. Department of Energy's Advanced Research Projects Agency -- Energy (ARPA-E) provided funding for the research. The technology has been licensed to Radi-Cool Inc.

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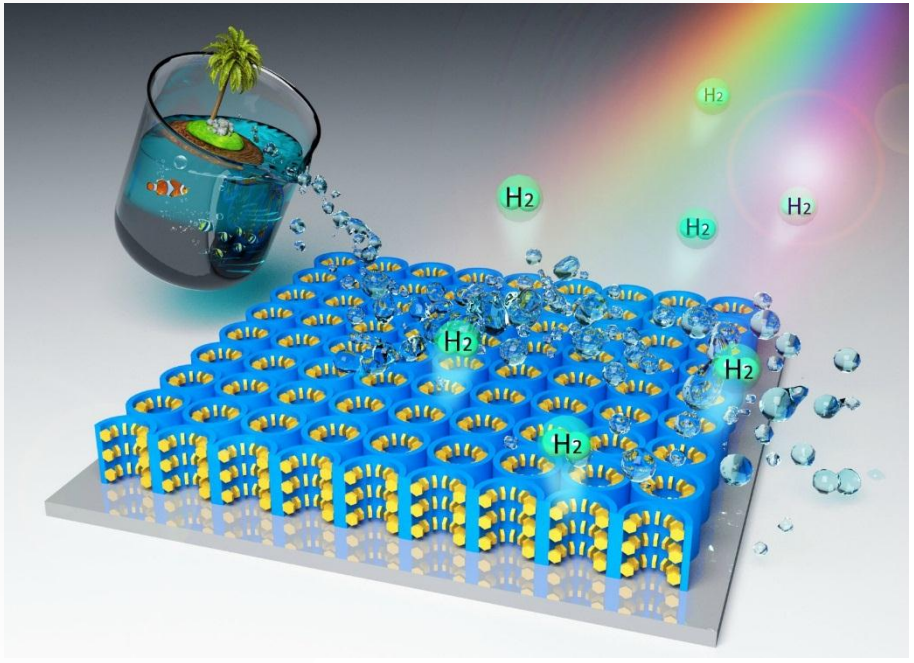
New catalyst produces cheap hydrogen fuel



Professor O'Mullane said the stored hydrogen could then be used in fuel cells.

"Fuel cells are a mature technology, already being rolled out in many makes of vehicle. They use hydrogen and oxygen as fuels to generate electricity -- essentially the opposite of water splitting.

"With a lot of cheaply 'made' hydrogen we can feed fuel cell-generated electricity back into the grid when required during peak demand or power our transportation system and the only thing emitted is water."

Professor Anthony O'Mullane said the potential for the chemical storage of renewable energy in the form of hydrogen was being investigated around the world.

"The Australian Government is interested in developing a hydrogen export industry to export our abundant renewable energy," said Professor O'Mullane from QUT's Science and Engineering Faculty.

"In principle, hydrogen offers a way to store clean energy at a scale that is required to make the rollout of large-scale solar and wind farms as well as the export of green energy viable.

"However, current methods that use carbon sources to produce hydrogen emit carbon dioxide, a greenhouse gas that mitigates the benefits of using renewable energy from the sun and wind.

"Electrochemical water splitting driven by electricity sourced from renewable energy technology has been identified as one of the most sustainable methods of producing high-purity hydrogen."

Professor O'Mullane said the new composite material he and PhD student Ummul Sultana had developed enabled electrochemical water splitting into hydrogen and oxygen using cheap and readily available elements as catalysts.
"Traditionally, catalysts for splitting water involve expensive precious metals such as iridium oxide, ruthenium oxide and platinum," he said.
"An additional problem has been stability, especially for the oxygen evolution part of the process.

"What we have found is that we can use two earth-abundant cheaper alternatives -- cobalt and nickel oxide with only a fraction of gold nanoparticles -- to create a stable bi-functional catalyst to split water and produce hydrogen without emissions.

"From an industry point of view, it makes a lot of sense to use one catalyst material instead of two different catalysts to produce hydrogen from water."

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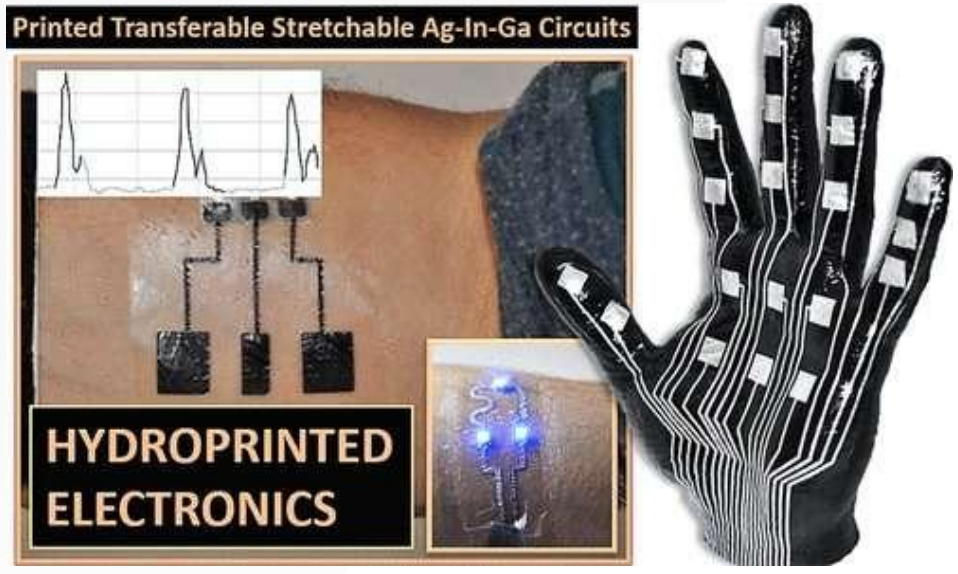
Flexible electronic skin aids human-machine interactions



Human skin contains sensitive nerve cells that detect pressure, temperature and other sensations that allow tactile interactions with the environment.

To help robots and prosthetic devices attain these abilities, scientists are trying to develop electronic skins. Now researchers report a new method in ACS Applied Materials & Interfaces that creates an ultrathin, stretchable electronic skin, which could be used for a variety of human-machine interactions.

Electronic skin could be used for many applications, including prosthetic devices, wearable health monitors, robotics and virtual reality.

A major challenge is transferring ultrathin electrical circuits onto complex 3D surfaces and then having the electronics be bendable and stretchable enough to allow movement. Some scientists have developed flexible "electronic tattoos" for this purpose, but their production is typically slow, expensive and requires clean-room fabrication methods such as photolithography. Mahmoud Tavakoli, Carmel Majidi and colleagues wanted to develop a fast, simple and inexpensive method for producing thin-film circuits with integrated microelectronics.

In the new approach, the researchers patterned a circuit template onto a sheet of transfer tattoo paper with an ordinary desktop laser printer.

They then coated the template with silver paste, which adhered only to the printed toner ink. On top of the silver paste, the team deposited a gallium-indium liquid metal alloy that increased the electrical conductivity and flexibility of the circuit.

Finally, they added external electronics, such as microchips, with a conductive "glue" made of vertically aligned magnetic particles embedded in a polyvinyl alcohol gel. The researchers transferred the electronic tattoo to various objects and demonstrated several applications of the new method, such as controlling a robot prosthetic arm, monitoring human skeletal muscle activity and incorporating proximity sensors into a 3D model of a hand.

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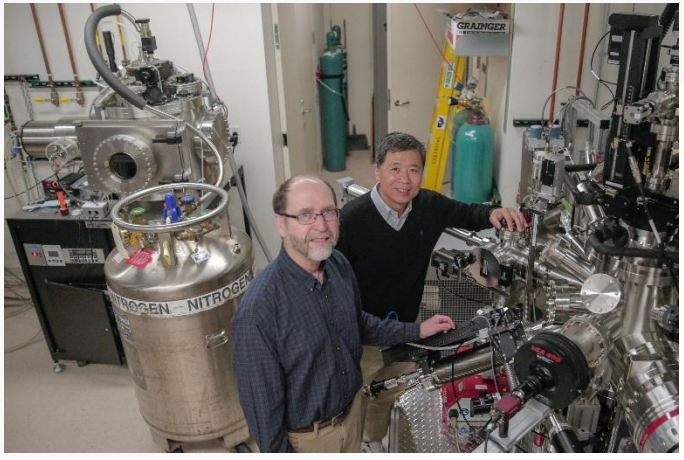
Switching identities: Revolutionary insulator-like material also conducts electricity

University of Wisconsin-Madison researchers have made a material that can transition from an electricity-transmitting metal to a nonconducting insulating material without changing its atomic structure.



They used a material called vanadium dioxide, which is a metal when it's heated and an insulator when it's at room temperature. At high temperatures, the atoms that make up vanadium dioxide are arranged in a regularly repeating pattern that scientists refer to as the rutile phase. When vanadium dioxide cools down to become an insulator, its atoms adopt a different pattern, called monoclinic.

No naturally occurring substances conduct electricity when their atoms are in the monoclinic conformation. And it takes time for the atoms to rearrange when a material reaches the insulator-to-metal transition temperature.

Crucially, vanadium dioxide transitions between a metal and an insulator at different temperatures depending upon the amount of oxygen present in the material. The researchers leveraged that fact to create two thin layers of vanadium dioxide -- one with a slightly lower transition temperature than the other -- sandwiched on top of each other, with a sharp interface between.

"This is quite an exciting discovery," says Chang-Beom Eom, professor of materials science and engineering. "We've found a new method of electronic switching."
The new material could lay the groundwork for ultrafast electronic devices. Eom and his international team of collaborators published details of their advance today (Nov. 30, 2018) in the journal Science.

Metals like copper or silver conduct electricity, whereas insulators like rubber or glass do not allow current to flow. Some materials, however, can transition from insulating to conducting.

This transition usually means that the arrangement of a material's atoms and its conducting electrons must change in a coordinated way, but the atomic transition typically proceeds much more slowly than the smaller, lighter electrons that conduct electricity.

A material that can switch to conducting electricity like a metal without moving its atoms could dramatically advance switching speeds of advanced devices, says Eom.

"The metal-to-insulator transition is very important for switches and for logic devices with a one or a zero state," he says. "We have the potential to use this concept to make very fast switches."

In their research, Eom and his collaborators answered a fundamental question that has bothered scientists for years: Can the electronic and structural transition be decoupled -- essentially, can the quickly changing electrons break out on their own and leave the atoms behind?

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Switching identities: Revolutionary insulator-like material also conducts electricity

When they heated the thin vanadium dioxide sandwich, one layer made the structural switch to become a metal. Atoms in the other layer remained locked into the insulating monoclinic phase. Surprisingly, however, that part of the material conducted electricity.

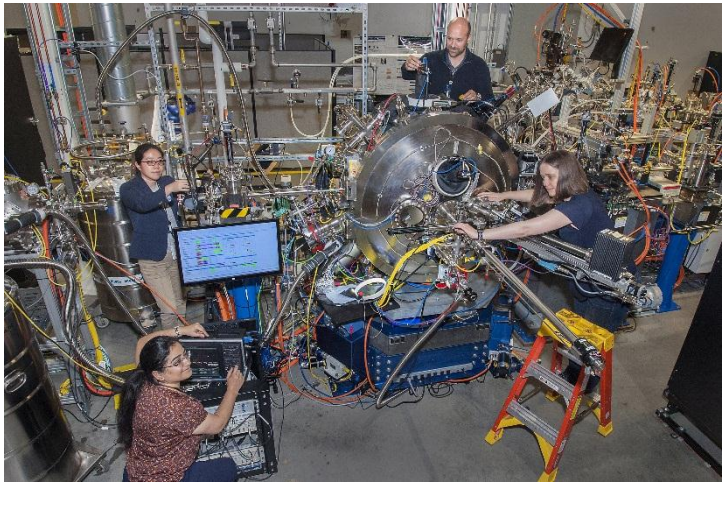
Most importantly, the material remained stable and retained its unique characteristics.

Although other research groups have attempted to create electrically conductive insulators, those materials lost their properties almost instantly -- persisting for mere femtoseconds, or a few thousandths of one trillionth of a second.

The Eom team's material, however, is here to stay.

"We were able to stabilize it, making it useful for real devices," says Eom.
Key to their approach was the dual-layer, sandwich structure. Each layer was so thin that the interface between the two materials dominated how the entire stack behaved. It's a notion that Eom and colleagues plan to pursue further.

"Designing interfaces could open up new materials," says Eom.
The Wisconsin Alumni Research Foundation is assisting the researchers with patent filing.



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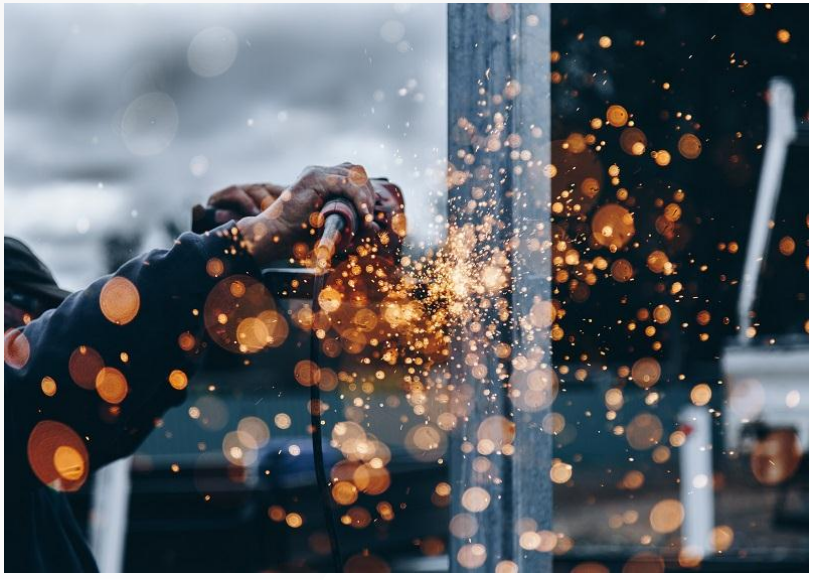
How to share health and safety information through building information modelling



PAS 1192-6 was specifically developed to enable users of BIM methods and techniques to identify, use and share health and safety information in a collaborative way. Doing so will ultimately help to drive health and safety risks further down through the life cycle of a project and built asset.

Because risks on a construction site vary widely, PAS 1192-6 requires each risk to be placed in context, with the filtering of hazards according to a scale. The guidance is explicit in assisting with how to prioritise elevated risks that are safety-critical.

BIM is now widely used to share design and technical information during project delivery and operation. Ant Burd introduces a new specification designed to get health and safety data included too.

users of building information modelling (BIM) will be the first to admit that, to date, there has been a dearth of guidance on how you should go about sharing all-important structured health and safety information across project and asset life cycles.

In 2018, UK business standards company BSI launched a 'publicly available specification' (PAS) for the sharing of health and safety information through a project or asset life cycle [you can view the launch event here, which was held at ICE in April 2018].

PAS 1192-6 Specification for collaborative sharing and use of structured Health and Safety information using BIM (BSI, 2018) supports the development of structured health and safety information for all building and infrastructure projects from the outset.

The document is the latest in the PAS 1192 series, which sets out the requirements for model detail, information, definition and information exchanges to achieve the UK government's requirement for level 2 BIM in the delivery of public sector projects (Kosandiak and Atkin, 2016).

Digital transformation

Until recently, health and safety risk management in the construction industry was largely a paper-based discipline.

In support of the ongoing digital transformation in the sector, BSI developed PAS 1192-6, which sets out a model process of how digital health and safety risk information should flow through every stage of a construction project. It focuses on the needs and perspective of the end user.

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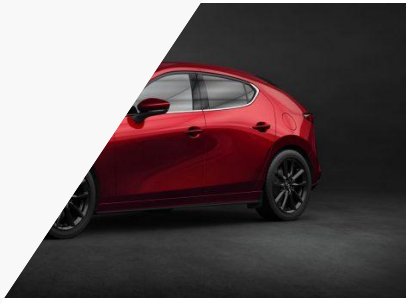
The all-new Mazda3



The cockpit design applies the “vanishing point” concept that emphasizes the focus on the driver and can be found on many details of the cabin.

At the 2018 Los Angeles Auto Show Mazda has revealed the all-new Mazda3 model, set to be launched on global markets from early 2019.

With over 6 million units sold since its launch in 2003, the Mazda3 is a global strategic model for the brand.

As Mazda reports, the design of the fully-redesigned model “adopts a matured Kodo design language that embodies the essence of Japanese aesthetics. While the overall design presents a simple, single form, subtle undulations bring the styling to life through shifting light and reflections that glide over the body surface.”

The new Mazda3 will be available as a sedan – with a focus on elegance – and as a hatchback – with a more dynamic look and personality.

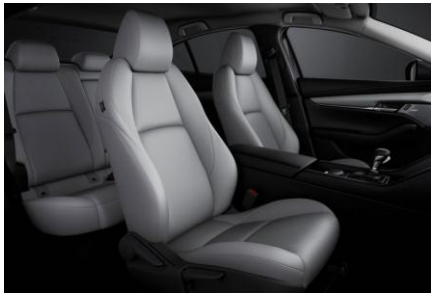
The rear end of the hatchback is characterized by a tight integration between the cabin and the body,which together appear as a single solid mass.

The sedan has a more classic, conservative look, with the hood, cabin and trunk designed as individual, distinct elements.

The lamp design is based on a minimalistic approach and is one of the key features of the Kodo design language latest evolution.

The new Mazda3 is based on Mazda’s SKYACTIV-Vehicle Architecture, and uses the latest evolutions of the various SKYACTIV engine models.

The interior design follows the same “less is more” principle, and features clean, uncluttered volumes.



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Dodge Super Charger 1968 Concept

The 1968 Dodge “Super Charger” Concept assumes a “wide body” stance thanks to front and rear fiberglass wheel flares painted “De Grigio” Grey Metallic body color.

The front wheels push forward two inches to accommodate the flares and shorten the Charger’s overhang, extending the classic’s wheelbase from 117 inches to 119 inches. Front wheels are stock 20 x 11-inch Devil’s rims pulled from the Challenger SRT Hellcat, while the rears are upsized 21 x 12-inch custom-milled aluminum Devil’s wheels.

Custom fiberglass front and rear bumpers are flushed up and shortened cross-car to provide an integrated design. The custom fiberglass front chin splitter takes influence from the Demon, while the custom rear spoiler is inspired by the modern Charger R/T.

The concept presented at the SEMA is equipped with a new MOPAR kit deaturing 1,00hp, that is available for cars produced before 1976 at under $30K.

At the SEMA Show Mopar presented the Dodge Super Charger 1968 Concept, a reimagined version of the iconic 1968 Dodge Charger, with the goal of promoting the Mopar brand’s new “Hellephant” 426 Supercharged Mopar Crate HEMI engine and kit.

The 1968 Dodge “Super Charger” Concept is adapted to accommodate the “Hellephant” engine coupled to a stock T-6060 manual six-speed Dodge Challenger SRT Hellcat transmission.

Exterior Design

Among the new design features are the supersized hood scoop modeled on that of the Dodge Challenger SRT Demon.

The hood features fiberglass construction on the outside with inner-steel construction inside carried over from the original vehicle.

The 1968 Charger’s pop-up headlamp design is tweaked to plant Dodge Challenger SRT Hellcat headlamps permanently behind the grille.

The original’s door handles and drip rails are shaved away, creating a clean, streamlined appearance. Front door vent windows are removed and replaced with a one-piece side glass. The 1971 Duster mirrors add a more modern appearance.

The lower exhaust tips are eliminated and replaced with Alfa Romeo Stelvio 5-inch dual-walled exhaust tips re-engineered to run through the taillamp housing.

Dodge Super Charger 1968 Concept

The Dodge Challenger SRT Demon seat delete option opens up the rear and also sheds weight while making space for a custom 2-inch roll cage designed to follow the profile and harmonize with the shape of the day light opening (DLO).

A Challenger SRT Demon net allows for storage of racing equipment such as helmets and gloves. A black Challenger SRT Hellcat carpet covers the rear of the interior, while the front features custom floor mats modified from the current Charger SRT and Mopar pedal kits for the Challenger.

The body drops 2.5 inches in the rear and 3.5 inches in the front. The braking system uses six-piston Brembos.

The trunk key cylinder lock is shaved and the Satin Black fuel door embellished with a custom-milled aluminum “Hellephant” medallion, one of many unique design touches incorporated throughout the “Super Charger” Concept.

Vehicle graphics and badging are Satin Black vinyl decals, including the “Hellephant” logo on the front fenders, “Super Charger” badging above the doors and classic tail stripes at the rear.

The brake lights have been uniquely reconfigured with LED lights that glow around the exhaust tips.

Interior Design

Inside, door panels and interior trim are Satin Black with the unique “Hellephant” milled medallion applied on the upper door panels. The Dodge Viper steering wheel also carries the “Hellephant” medallion at its center. The instrument panel insert is “De Grigio” Grey Metallic body color and the dash is customized with a full array of Mopar gauges.

The body-color center console holds a manual shifter from the Dodge Challenger SRT Hellcat, as well as the ignition button and toggle switches for the headlamps, wipers, fog lights and hazard lights.

The stock front seats have been replaced with Dodge Viper seats re-wrapped in Alcantara leather accented with red stitching and are fitted with four-point Sabelt black racing harnesses.

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Student's Corner

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Design Tool : CATIA V5.

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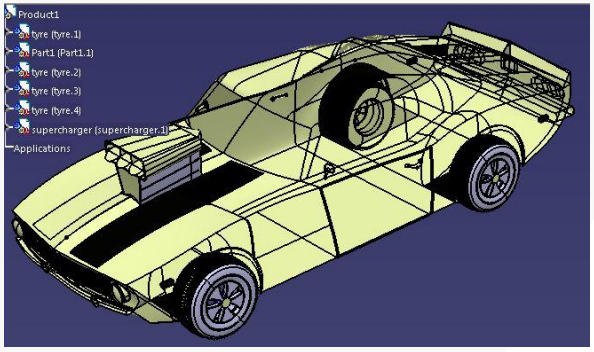
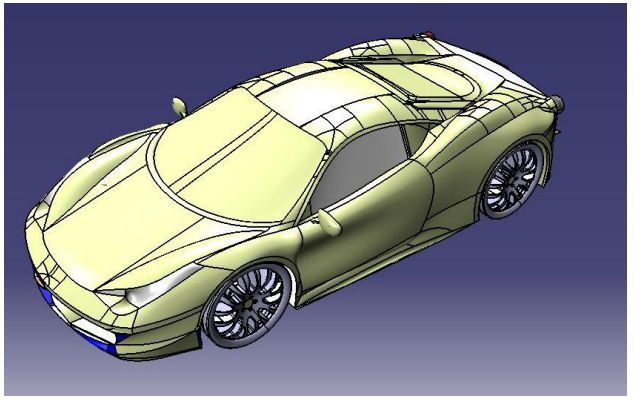
Student's Corner

DAuto Training Yield





By :
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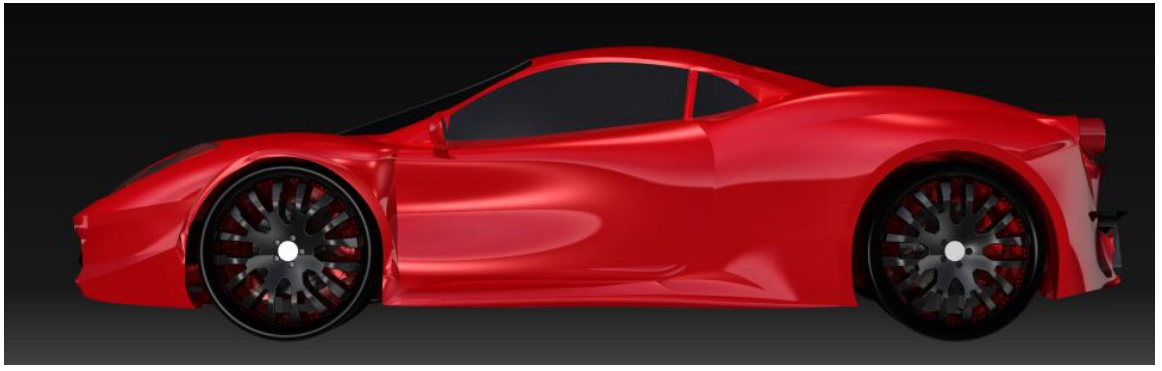
OIST, Bhopal
Design Tool : CATIA V5



By :
Pankaj Patel
TIT-E, Bhopal
Design Tool : CATIA V5

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“Never be satisfied with inaction. Question and redefine your purpose to attain progress”

Jeffrey K. Liker, The Toyota Way

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