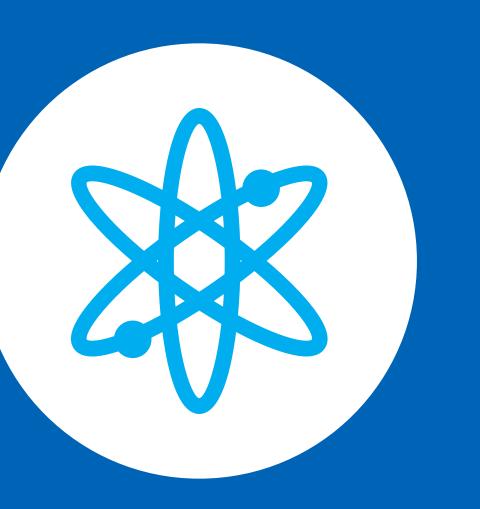
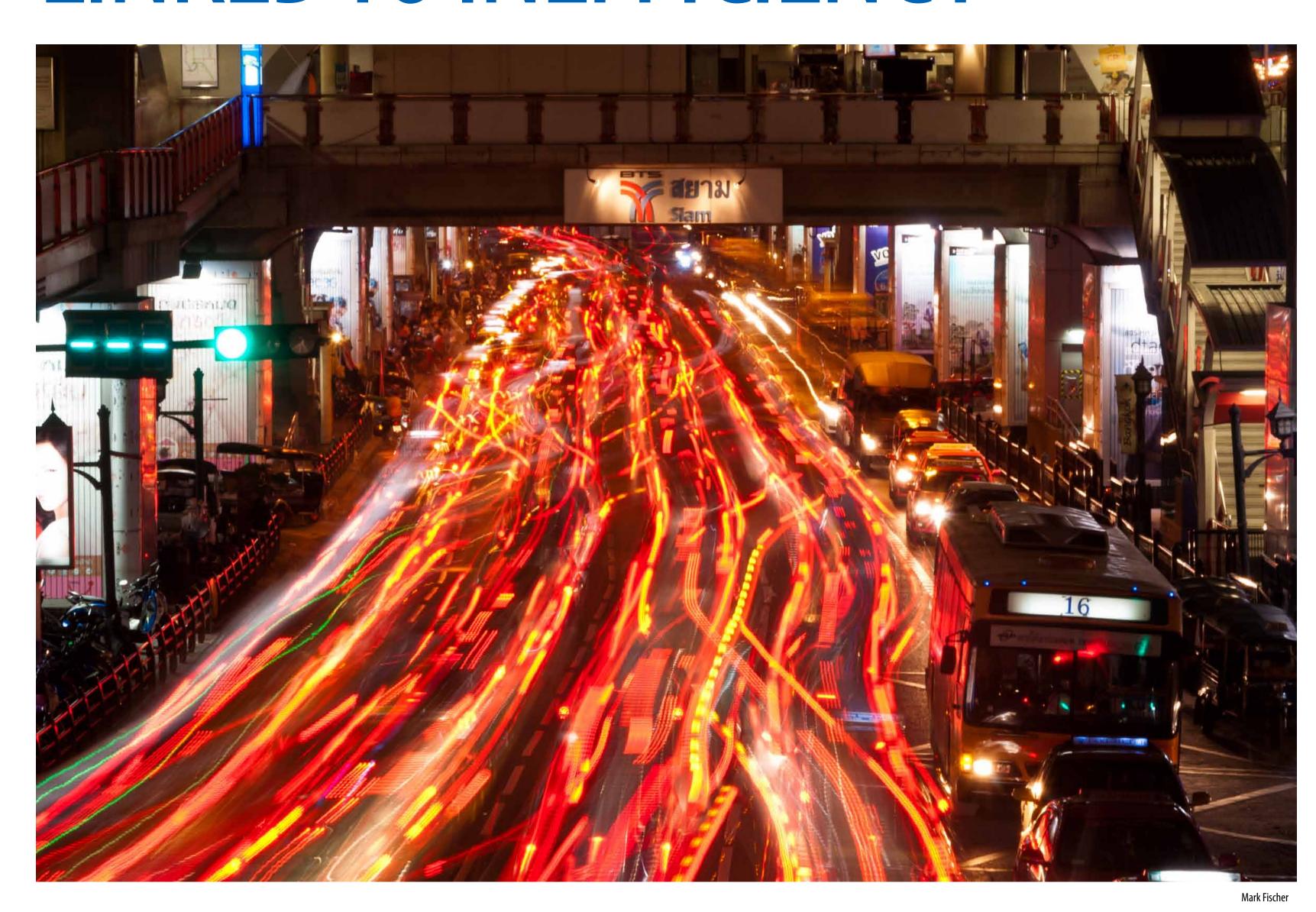
HE FUTURE OF ENERGY STORAGE



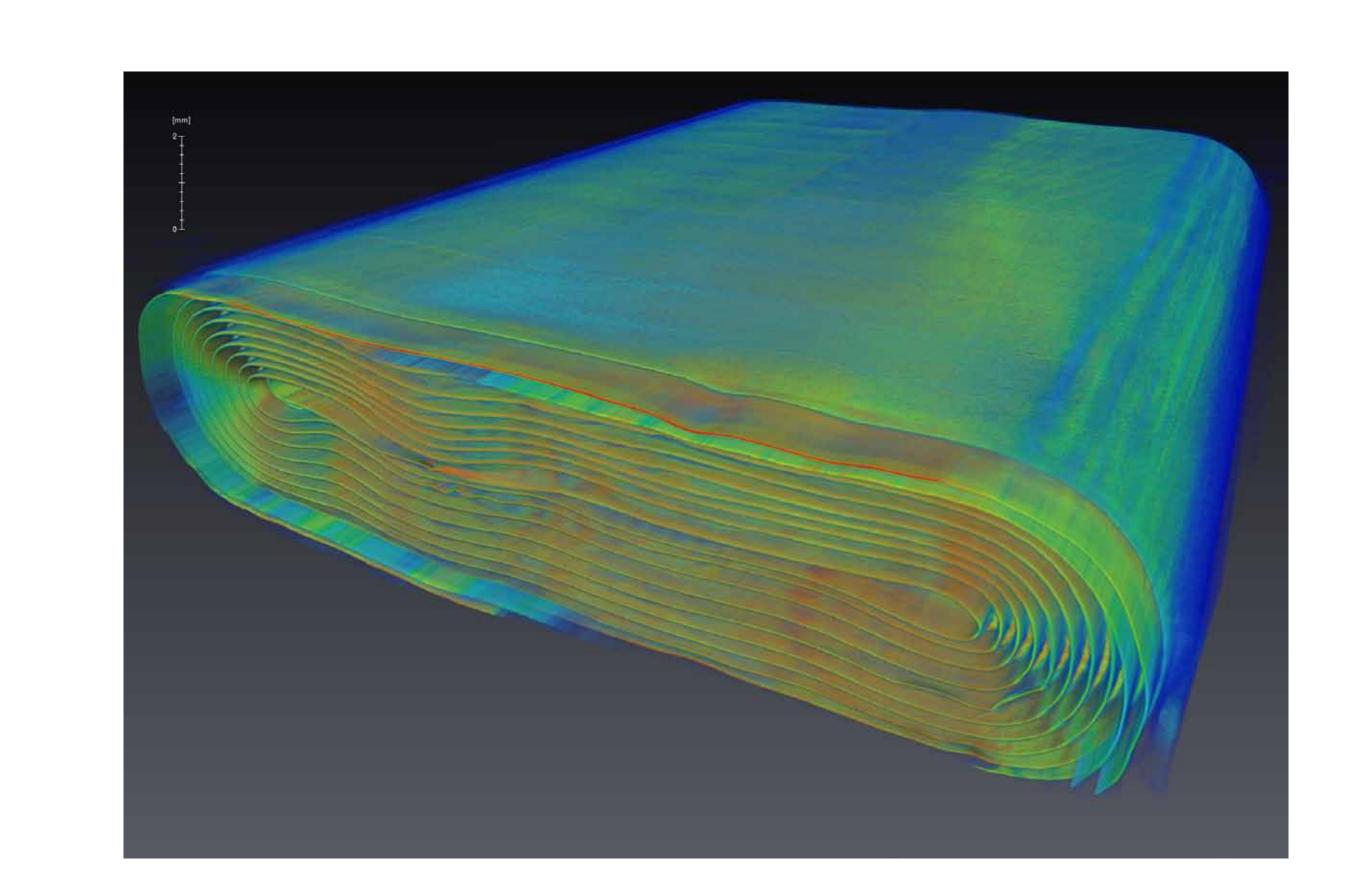


Why do devices like cell phones and computers use up so much energy? A team from Texas A&M University are answering this question and creating more efficient batteries by studying how a "traffic jam" of ions slows down charging and discharging. In order for a battery to function properly, lithium ions need to move in and out smoothly. The problem is that once the lithium ions get in, they stop at some point along the way. This not only slows everything down but can prevent the device — be it a cell phone or a laptop computer — from exploiting its full battery potential. Building a better battery boils down to figuring out the best way to move electrons, and the team is working to develop new materials to keep things moving.

Batteries play an important role in everyday life, powering everything from our phones to our cars, and developing better battery technology will help create a greener planet by storing renewable energy for long term use. Titanium dioxide is an environmentally-friendly, low-cost, nontoxic and highly effective electrode material for battery applications. Doping titanium dioxide with



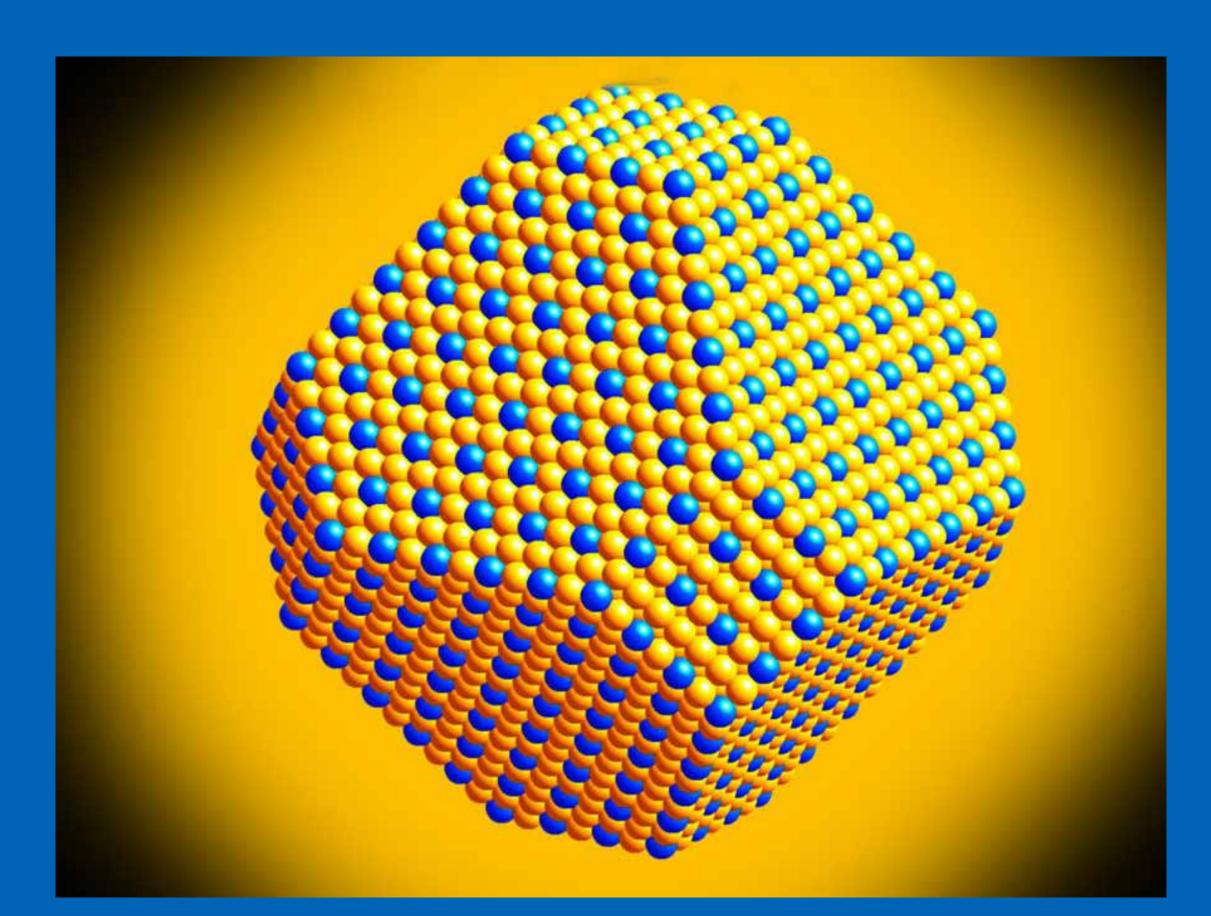
sodium shows promise as a method to enhance titanium dioxide's capabilities. It is important to understand what structural changes sodium doping causes and how this affects electrode performance. However, it has proved difficult to characterize the structural differences between these materials. Researchers from Western University, University of Saskatchewan, and the CLS used unique X-ray techniques to probe the molecular structure and bonding of sodium titanate and pure titanate.



PERINGINSIDE BLOWN-UP BATTERIES

When a lithium-ion battery, like the ones in our laptops and smart phones, is overheated or overcharged, internal components can chemically react with each other, generating gas inside the battery. The trapped gas is what produces the "pillowing" effect, which can decrease performance, or worse: the battery can leak, cause damage, or even explode. To understand how this happens, and to get some insight into battery safety, CLS scientists performed highly detailed CT scans on lithium-ion batteries before and after pillowing. The resulting images will help battery companies better understand the role that small manufacturing defects can play when it comes to performance and safety, ultimately leading to better, safer batteries.

HIGHLY EFFICIENT SINGLE-ATOM CATALYST COULD HELPAUTO INDUSTRY



A longer-lasting, higher-efficiency platinum catalyst developed by a Dalhousie University-led team will be of some interest to the automobile industry. Platinum catalysts help deactivate hydrogen fuel cells possible. The new catalyst combines gold and platinum resulting in nearly 100-fold increases in efficiency, but there is more work required. The researchers used gold because other, less expensive metals to make the process affordable for

ADVANCEMENTS BATTERY TECHNOLOGYIDEAL FOR ELECTRIC VEHICLES



Limitations in battery technology, including poor rechargeability and expensive material, have held back electric vehicles and the move to renewable energy sources over time. Most battery electrode materials involve costly elements such as cobalt and manganese, but there's one promising electrode material that we get for free: air. Metal-air batteries are a promising energy storage technology that use a pure metal, like lithium or sodium, and in reaction with oxygen taken in from the air around it. A big problem with these batteries is that they can't be recharged due to the buildup of reaction byproducts. A team of researchers from Western University used the CLS to analyze the byproducts found at the metal surface, which is an important first step in figuring out how to prevent buildup and build a rechargeable air battery for commercial use. 101:10.1039/







toxic exhaust gases from traditional car engines. Platinum also drives the chemical reactions that make zero-emissions of its stability but it is very expensive. The next step is to find industry.