Each year Harbin, China is transformed into a 180,000 ton city of winter wonderland called “Snow and Ice world” **shares Business Insider on January 5, 2016.** Startlingly, the weight of this ice city is equivalent to the weight of batteries that are thrown into landfills each year **reports** the **Environmental Protection Agency, last updated in 2012**. This makes sense considering batteries are ubiquitous in daily life. However, a UCI doctoral student Mya Le Thai recently created a rechargeable lithium-ion based battery with a conceivable lifespan of 400 years. While the battery has potential in shaping the future of battery technology, it is still in its infancy, which brings about some drawbacks. So today we will explore this 400 year-long rechargeable battery by first, powering through how this new battery compares to the current models, second, charging into the negative implications, before finally plugging into the involvement the battery can hold in its future.

On the list of its frequently asked questions **the rechargeable battery recycling corporation’s website** has a question we may all be wondering, “Why is it so important to recycle rechargeable batteries? Don’t they last forever?” **Last updated this year**, the website goes on to inform us that most rechargeable batteries only last about 2-5 years or 1,000 cycles. Reginald Penner, a lead author of the paper on the new battery, best explained to **Popular Science on April 21, 2016** that rechargeable batteries are like transferring water from one cup to another, some water is bound to spill out after a few hundred transfers, or in a batteries case, have less charge. Penner told **Huffington Post on April 23, 2016** that the research team’s original plan was to test nanowires, not create a new super battery. **Good Magazine noted on September 13, 2016** that a typical battery is lithium-ion based and lasts only 300-500 charge cycles. Not only do they have a short expectancy, but they are also more prone to corrosion. So although batteries make it possible for many electronic devices to work, there still comes a time when their life comes to an end, enter the super battery.

**The Journal Energy Letters on April 20, 2016, the researcher’s report of the finding, explains** thatgold nanowires were coated with a manganese dioxide shell and then encased in an electrolyte made of a Plexiglas-like gel. By having the gold nanowires coated in manganese oxide surrounded by a layer of electrolyte gel, it helps protect the battery from corrosion. The aforementioned **Huffington Post** article reported that while advancing the nanowire technology, scientists needed to avoid reducing the total amount of energy that is stored. In Mya Le’s experimentation, she coated the whole manganese-dioxide shell in a thin layer of the Plexiglas-like gel before cycling the battery. **Popular Science further examined on April 21, 2016** that gel does four important things; it holds the wire together, makes the metal oxide softer and more fracture resistant, and finally prevents corrosion, which ensures extremely long cycles. **Popular Science on April 21, 2016 emphasized** that when put to the test, the nanowire battery cycled through 200,000 recharges without significant corrosion or decline, 400 times longer than traditional batteries. Now that we understand how this new super battery works, we can examine some of its drawbacks.

Contrary to popular belief, not everything we recycle is more beneficial than throwing it away in the trash, and batteries are one of those items. **Seattle Post wrote on September 21st, 2016**, that chemicals found in most batteries include, cadmium, lead, mercury, nickel, lithium, and electrolytes and as you can imagine, once a battery case erodes, these chemicals escape, and seep through to the soil eventually making their way into our oceans and water supply. **Battery University unraveled on May 25, 2016** that cadmium is more detrimental than lead when ingested. Lead and Cadmium are both known to cause harm to almost every organ as well as every system of the human body. In addition to the harms these chemicals can exhibit, **American Disposal Services reported on May 20, 2015,** that rechargeable batteries pose the most risk to starting recycling truck fires. When opened to heat and pressure, not to mention being surrounded by cardboard and dry paper, it “cause[s] them to spark, setting off a chain reaction…” **Popular Science reported** that the reason fires break out is because lithium batteries are extremely combustible and sensitive to temperature. In fact, just this year it was reported by **KXAN news on February 23, 2016** that a SUV caught on fire due to AA batteries being left alone in the glove box. Moreover, according to **National Fire Protection Association or the NFPA in February 2016**, the electric vehicle industry has invested heavily in lithium-ion technology, which has become increasingly prominent for emergency responders. Three weeks after a 2011 crash test a Chevy Volt caught fire, prompting the NFPA to examine this issue with government agencies, insurers, and car manufacturers on a national level. And because these new batteries are still lithium-ion based, the issue of exposure to heat and pressure in storage or in recycling can still be a major problem. While there still remains some concerns with this new battery, there are countless possibilities for its future.

Now, when we hear of new technology our immediate thought is, how much? Well, **Popular Science** wrote that even though a small amount of gold is used for the nanowires, it could come at an expensive cost. However, the team of researchers are hoping that if this technology catches on, nickel could be used as an alternative. With nickel acting as a substitute, this battery technology will be available to all at a low cost. Another common problem with batteries is certain electronic manufacturers make the batteries next to impossible to replace on their devices. They force the consumer to purchase brand new units, because the batteries are so difficult to replace, unable to make a simple battery swap. Apple Support even wrote about if a customer is having complications with their phone battery, that the repair will take 3-5 business days, not to mention if the battery needs to be replaced it will come at a costly price, if you do not have Apple Care. It goes to show how batteries cannot be easily replaced by the owner themselves. Computers and smartphones that have the potential to have a longer battery life can benefit people of all walks of life. As you may know, college students that are part of a speech and debate team rely so much on technology. They are either on their phones or laptops gathering information for debates, IPDA, and extemporaneous rounds. Well with this super battery, they wouldn’t have to worry about their electronic devices dying in the middle of their prep time. By having longer lasting commercial batteries, it also has the potential to cut down on the waste that is being thrown out each year. Not that we have to worry about recycling for a long long time and by the time we have to replace these batteries we’ll know how to do it. Of course at this point the possibilities are endless.

Today, we explored Mya Le Thai’s 400 year old rechargeable battery by first, examining the nanowire battery and how it works, second, the negative implications, and finally plugging into the potential the battery can hold in its future. A rechargeable battery with a conceivable lifespan of 400 years can be revolutionary. There is no doubt that each of us can benefit from this super battery and not throw a city’s worth of batteries away each year, but like all good things it may come at a cost.