



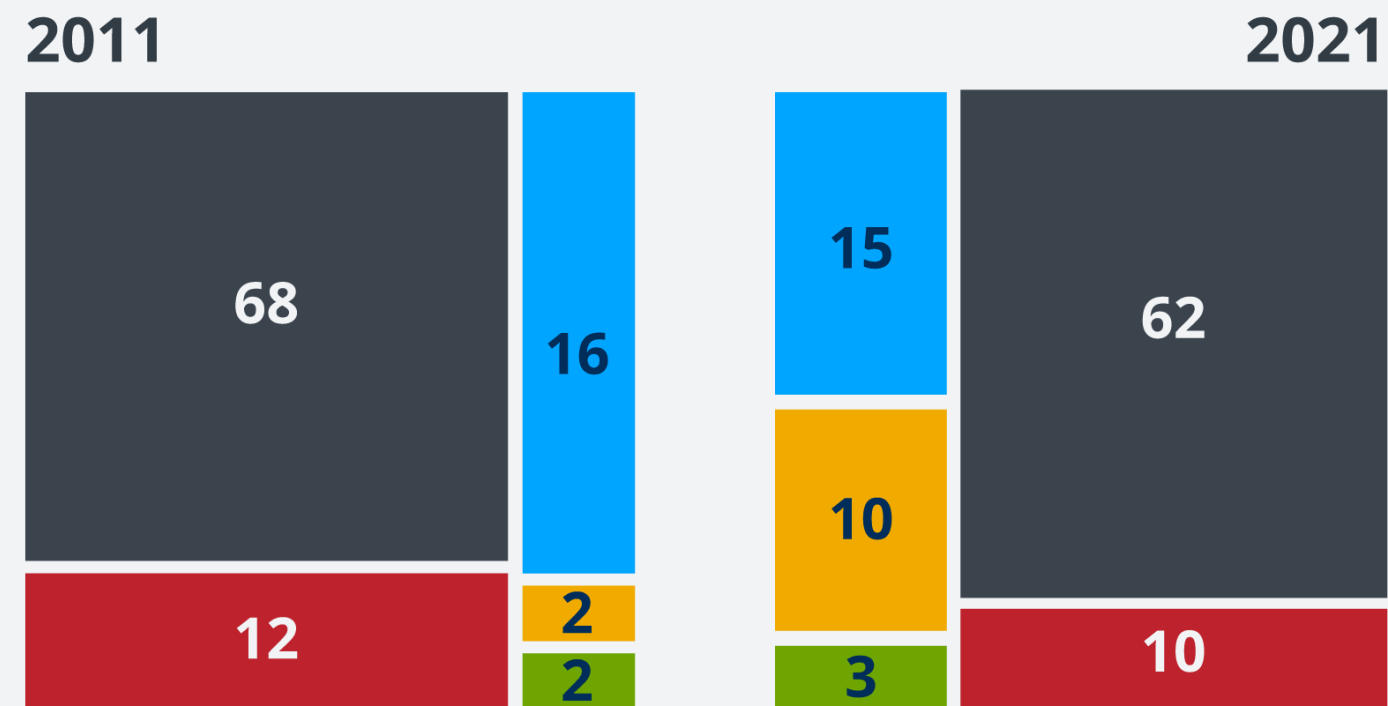
Next-Gen Mg-ion battery: Low cost and High Energy Density

A Post-Li Battery Technology

Problem: Energy Storage Required For Affordable, Reliable, Decarbonized Electricity Systems

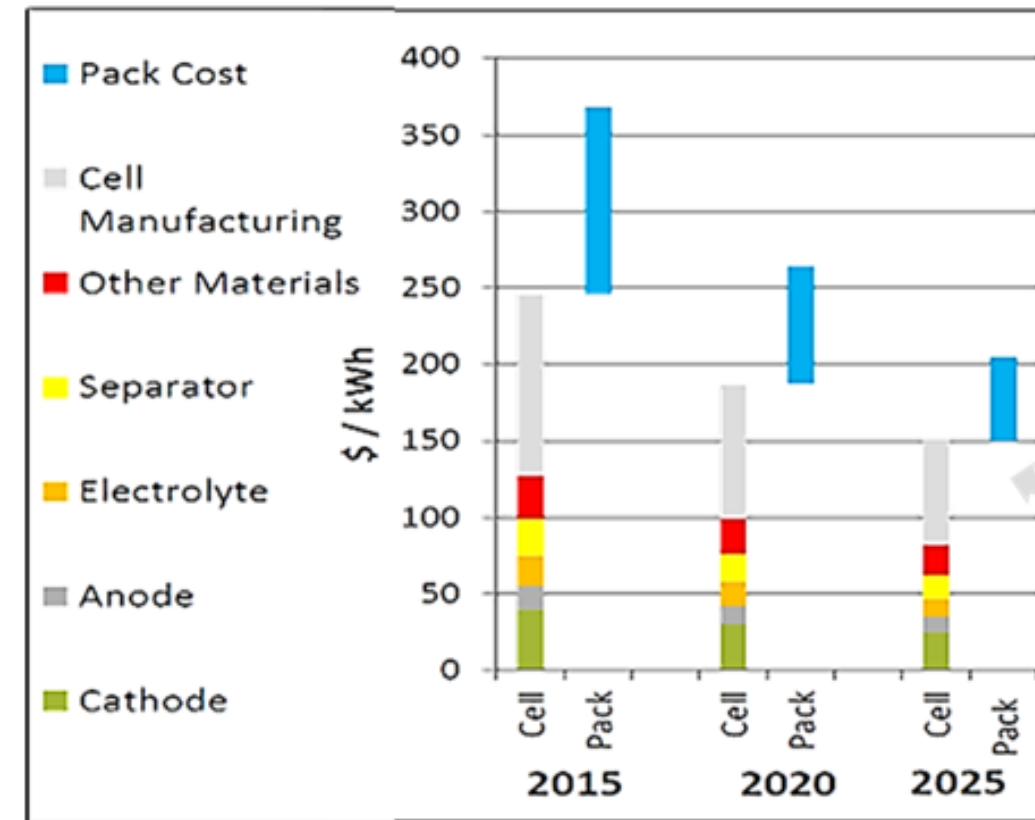
Slow increase in renewable energy since 2011 (in %)

■ Fossil fuels ■ Nuclear power ■ Hydropower
■ Solar and wind power ■ Bioenergy and geothermal power



Source: REN21 Renewables 2022 Global Status Report

High cost



a. Evolution of LIB component, cell and pack costs. [1]

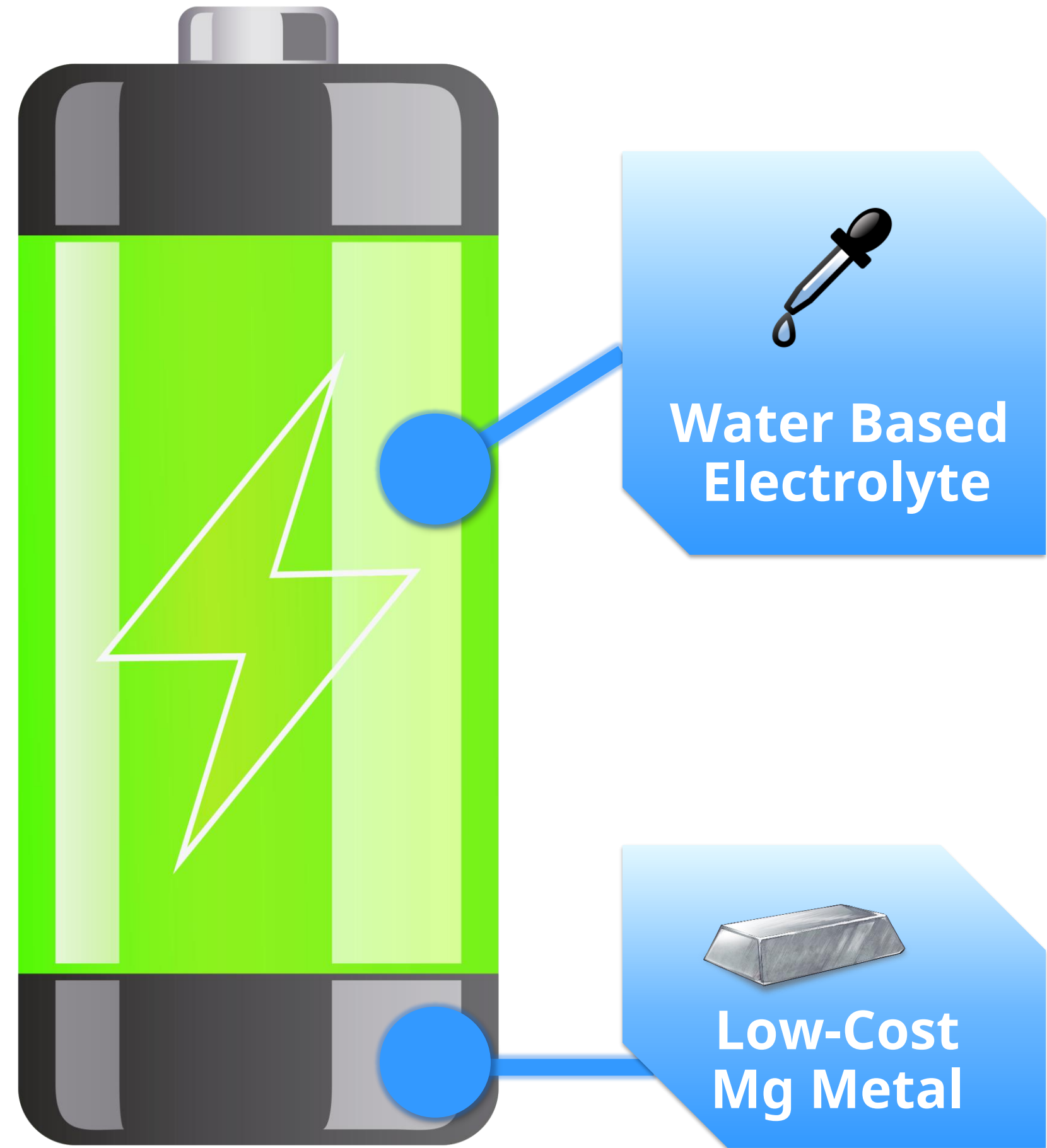
Safety Concern



Slow charging speed



Safer, cheaper, high-performing solutions



Advantages Compared To Commercial Li-ion Batteries



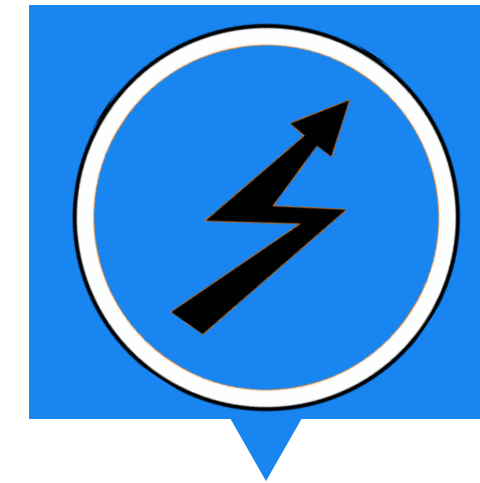
High Safety

Using **water** as solvent instead of **organic** chemicals



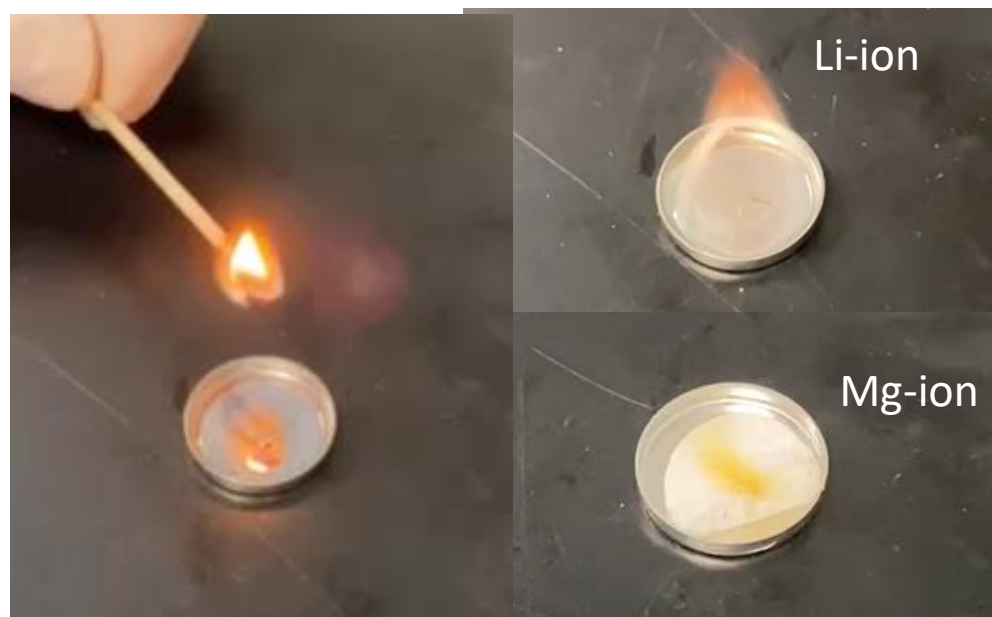
Low Cost

Being **abundant** in earth, the metals are low cost.

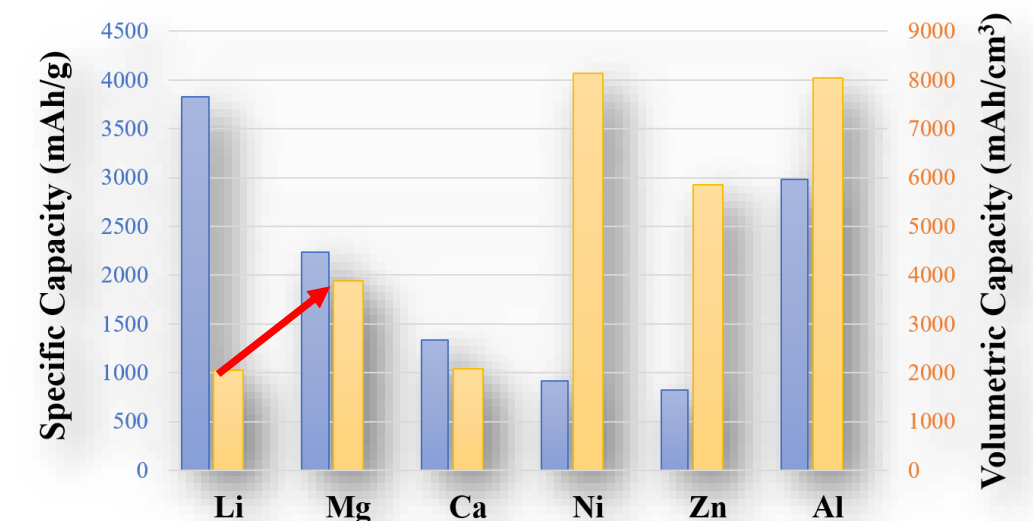


High Performance

Utilized **high-energy metals** (Al, Mg, Zn etc.) and multi-electron redox ions



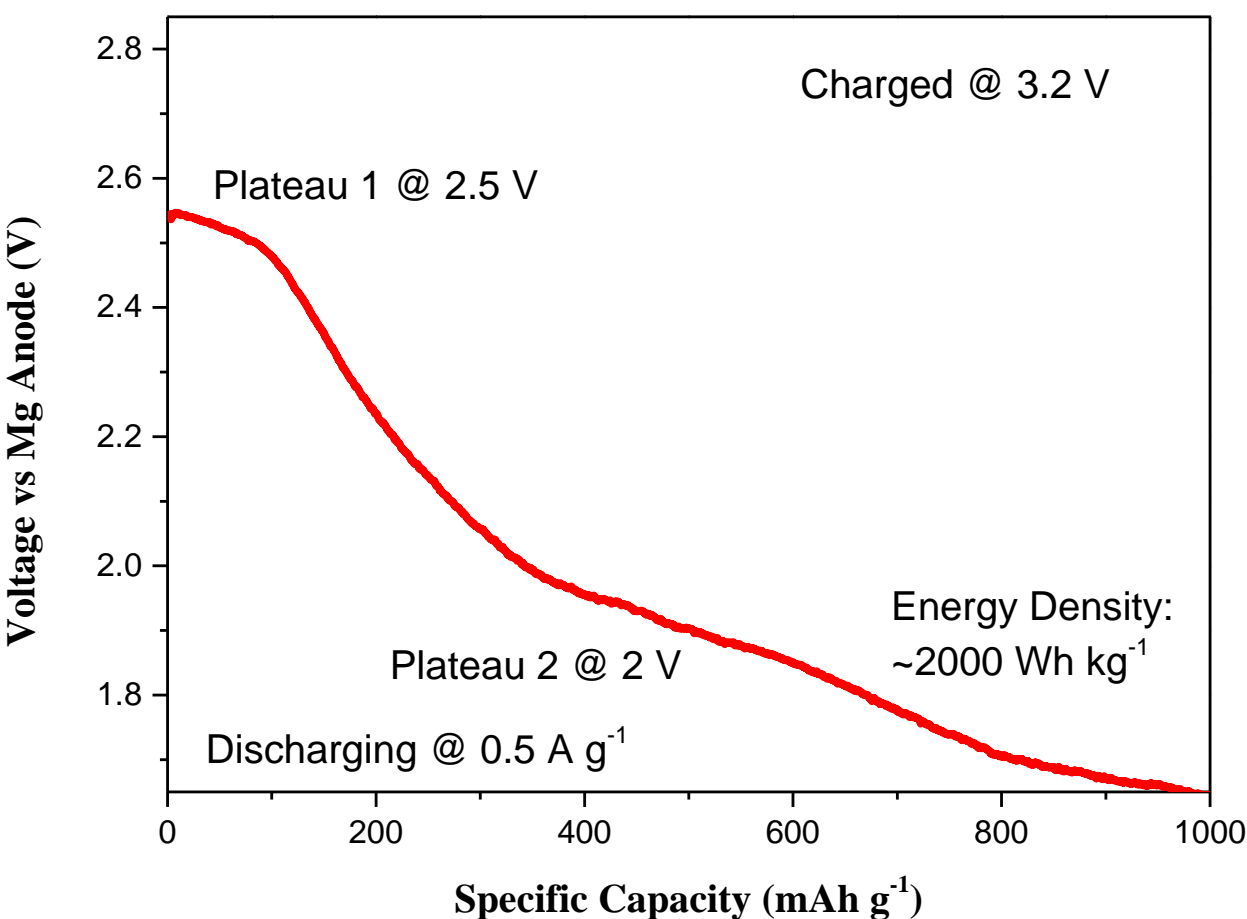
	Li	Mg
price (U.S. \$/lb)	4.0	2.5



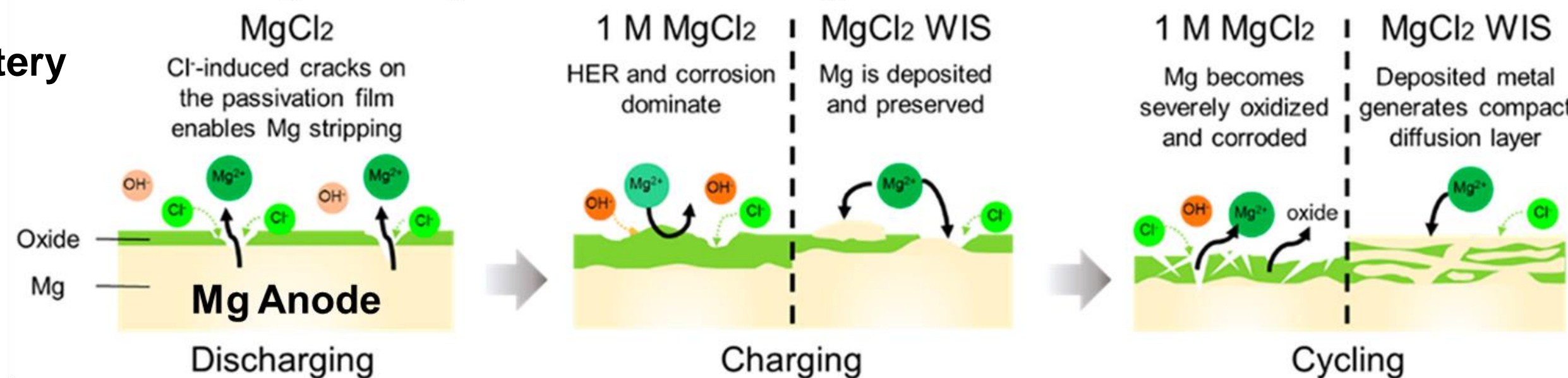
Introduction to our Technology:

Novel aqueous system to utilize metal as anode

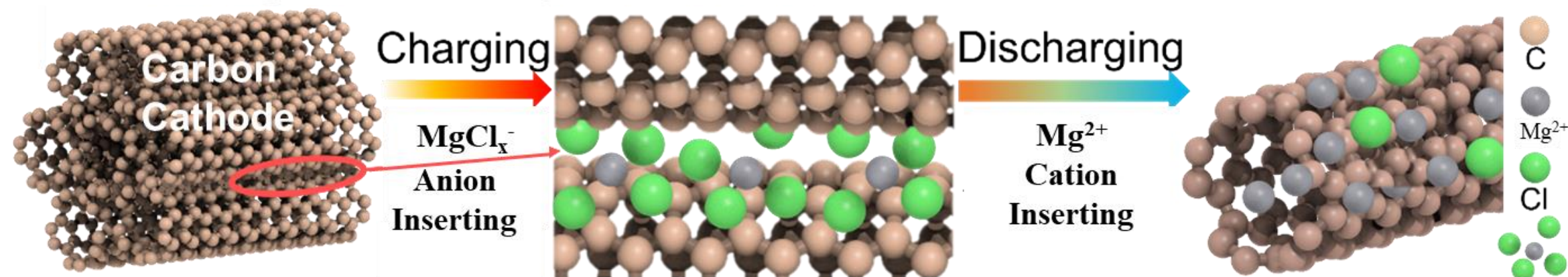
Discharge Behavior of the novel Mg-ion battery



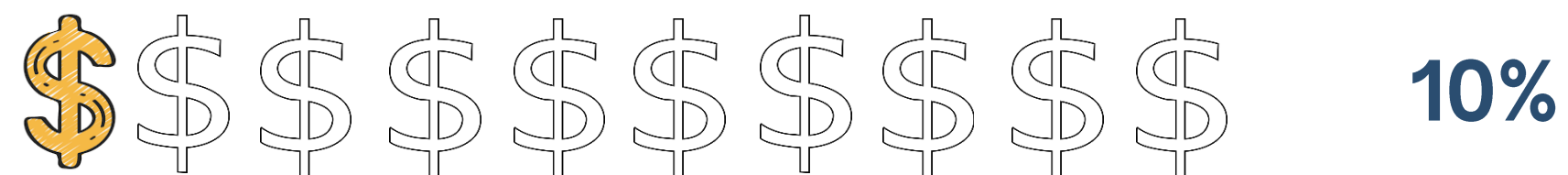
(a) Enhancing Stability and Potential of Mg Anodes



(b) Overcoming Low Capacity Issues in Cathodes



Battery Cost to Li-ion Batteries



Energy Density to Li-ion Batteries

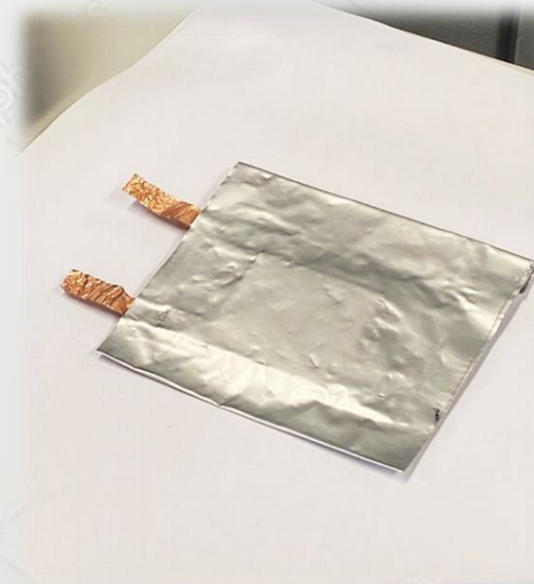
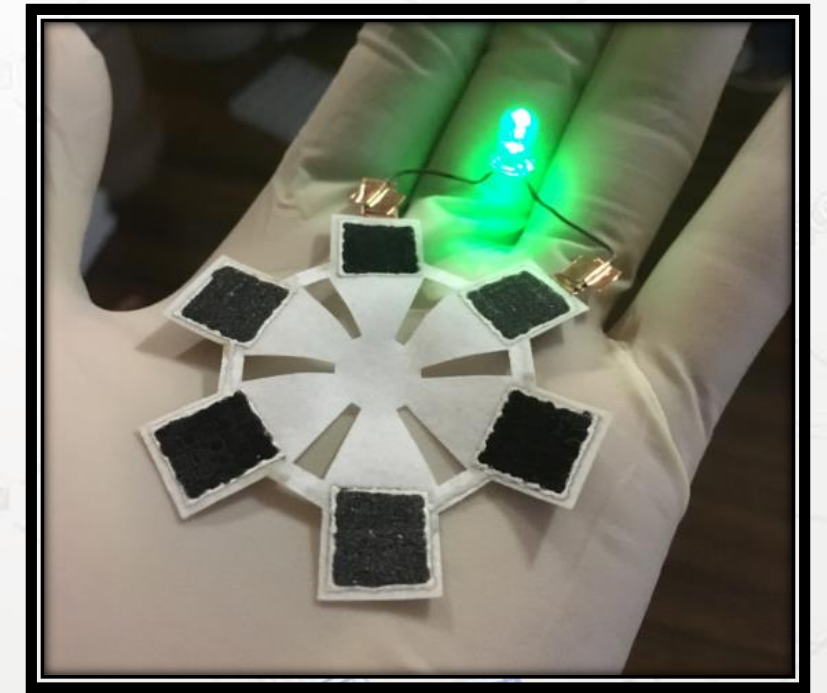


High Performance

Comparable performance to Li-ion batteries

Low Cost & Safety

Lower Cost than Li-ion batteries



Comparative Analysis of Various Battery Technologies

	Li-ion Battery	Zn ion battery	Other Mg-ion battery	Our Mg-ion battery
Discharge Voltage (V)	~3.5	~1.4	~1.1	2.5-1.7
Energy Density(On Material,Whkg⁻¹)	300-700	200-600	~100	>1000
Metal Price (U.S. \$/lb)	4.0	1.5		2.5