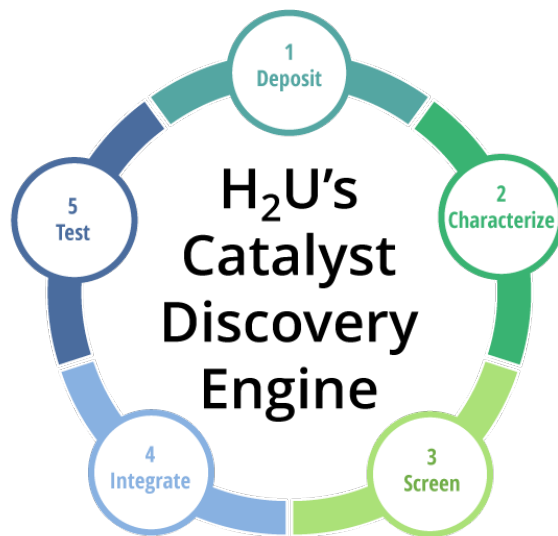


The Catalyst Discovery Engine

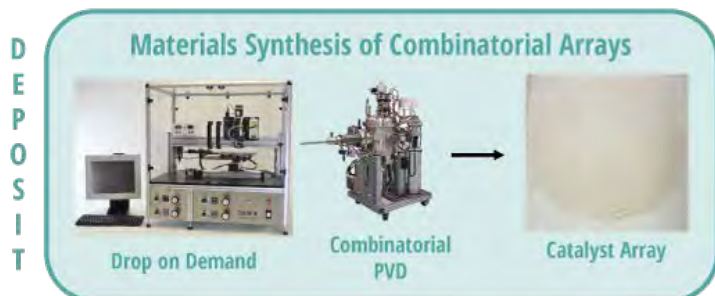
The H2U CDE is a data-driven, screening process that allows scientists to rapidly make, characterize, and quantify the catalytic activity of material compositions and then close the loop with big data analysis and artificial intelligence. Within the current decade, conservative projections call for 100+ GW of new installed electrolyzer capacity. At this rapid growth rate, highly constrained sources of platinum group metal (PGM) materials will lead to product shortages and Proton Exchange Membrane (PEM) electrolyzer price increases. Using its patented CDE, H2U Technologies has discovered novel, non-PGM catalyst materials that can mitigate supply chain risks in the production of low-cost renewable hydrogen at large scales. Partner with us to ensure that PGM supply chain issues won't derail your next clean energy project.



Electrocatalyst Discovery Process

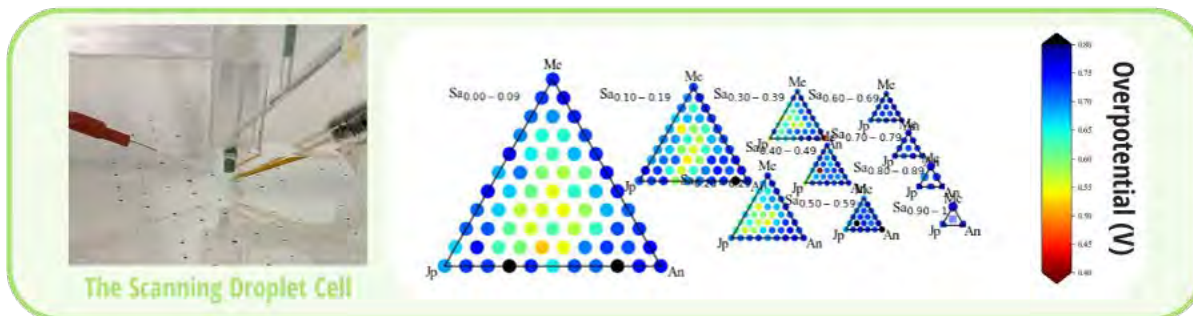
The technology and IP forming the core of the CDE were developed over 10 years at the California Institute of Technology (Caltech) through a \$122M Department of Energy (DOE) grant. This iterative process occurs in five key steps, outlined below.

First, arrays of potential catalyst compositions are prepared by one of two different methods: drop-on-demand dispensing or physical vapor deposition. Each spot in the resulting catalyst array consists of a distinct composition of material. Methods are available for depositing essentially any combination of up to six elements at a time, allowing our scientists to rapidly explore the periodic table for potential catalyst hits. These combinatorial arrays can then be annealed under a variety of conditions to produce a broad catalogue of potential catalyst candidates. Each catalyst spot is characterized via high-throughput X-Ray Fluorescence to ensure that our scientists have successfully fabricated the target materials.



The validated catalysts are screened for their catalytic activity using H2U's patented Scanning Droplet Cell (SDC). The SDC screens catalyst materials faster than any other known technique, making it a highly valuable tool in the ongoing search for PGM replacements. Using this method, H2U scientists can rapidly analyze an entire plate of hundreds of catalyst materials in a few hours. The data from each experiment then guides and informs subsequent searches for electrocatalyst candidates.

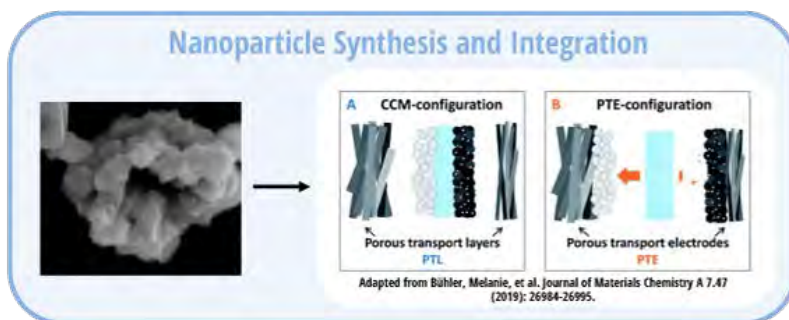
SCREEN



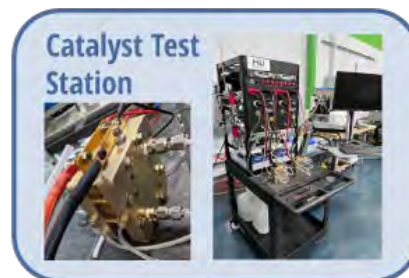
Materials Integration

In an electrolyzer, materials integration is often as important to catalyst performance as the material itself. Because of this, H2U has designed a holistic process that begins with catalyst discovery and ends with materials testing in an electrolytic testbed. Promising catalyst candidates are synthesized in house in small batches and incorporated into electrolytic cells using a variety of techniques to optimize both performance and durability. The integrated materials are then evaluated in one of H2U's Catalyst Test Stations to validate catalyst performance.

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Benefits and Opportunities

The H2U proprietary catalyst discovery process offers unparalleled ongoing support for performance improvement. With these rapid-screening tools, H2U can optimize materials over key performance parameters including cost, efficiency, and durability. Leveraging this technique, H2U scientists have discovered multiple families of catalyst materials that could replace rare, expensive metals like iridium. Undertaking electrolyzer catalyst discovery with H2U presents an opportunity to leverage H2U's unique and proprietary CDE to discover and evaluate new electrocatalyst compositions and collaborate to test these materials in commercially relevant conditions.

Together, we can develop for your business, an insurance policy against future supply chain issues and help to grow the hydrogen economy.