Advanced Research Projects Agency • ENERGY

HEATS PROJECT

MIT

ADVANCED THERMO-ADSORPTIVE BATTERY

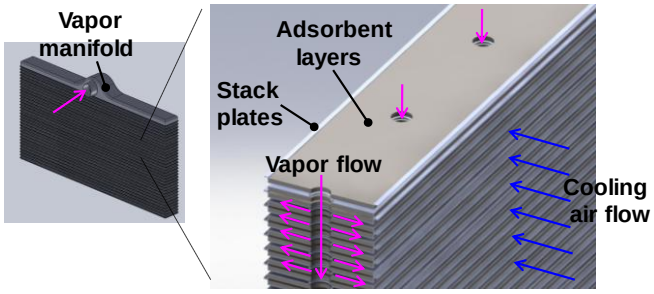
PROJECT TITLE:	Advanced Thermo-Adsorptive Battery Climate Control System		
ORGANIZATION:	Massachusetts Institute of Technology (MIT)	LOCATION:	Cambridge, MA
PROGRAM:	HEATS	ARPA-E AWARD:	$2,700,000
TECH TOPIC:	Electric Vehicles	PROJECT TERM:	12/31/11 – 12/12/14
WEBSITE:	http:// drl.mit.edu/research.cgi?p=storage		

CRITICAL NEED

The transportation sector is the dominant source of U.S. dependence on foreign oil and a major contributor of greenhouse gas emissions. Enabling more widespread use of electric vehicles (EVs) would reduce both our dependence on foreign oil and our harm to the environment. Inefficient heating and cooling systems can limit the driving range of EVs by acting as a drain on their batteries. Rechargeable, thermal energy storage-based hot-and-cold batteries can provide efficient heating and cooling to EVs without draining the on-board battery packs, in effect extending the driving range of EVs per electric charge. These will also enable thermal management of internal-combustion engine vehicles.

PROJECT INNOVATION + ADVANTAGES

MIT is developing a low-cost, compact, high-capacity, advanced thermo-adsorptive battery (ATB) for effective climate control of EVs. The ATB provides both heating and cooling by taking advantage of the materials' ability to adsorb a significant amount of water. This efficient battery system design could offer up as much as a 30% increase in driving range compared to current EV climate control technology. The ATB provides high-capacity thermal storage with little-to-no electrical power consumption. The ATB is also looking to explore the possibility of shifting peak electricity loads for cooling and heating in a variety of other applications, including commercial and residential buildings, data centers, and telecom facilities.



IMPACT

If successful, MIT's ATB technology has the potential to transform on-demand cooling and heating in EVs, while increasing their driving range up to 30% relative to today's best cabin climate control technology.

- SECURITY: Increased use of EVs would decrease U.S. dependence on foreign oil – the transportation sector is the dominant source of this dependence.
- ENVIRONMENT: Greater use of EVs would reduce greenhouse gas emissions, 28% of which come from the transportation sector.
- ECONOMY: This technology would increase the marketability of EVs—helping spur growth in the automobile industry.
- JOBS: Increased use of EVs could create new manufacturing and engineering jobs in the automobile industry.

CONTACTS

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