

Waste Heat Energy Conversion using Ammonia-based Battery

ID# 2014-4238



Stack gas sources low-grade waste heat

Technology Summary

The disclosed invention is a thermally regenerative ammonia-based battery (TRAB) that can capture waste heat from industrial machinery and turn it into electricity. The power is derived from copper-based battery electrode reactions, with recharging achieved by separating out ammonia (NH₃) from spent electrolyte using a closed-loop system with waste heat.

Application & Market Utility

Low-grade heat utilization has potential for carbon-neutral electricity production. Large amounts of low-grade heat energy is available at many industrial sites; it can also be produced from geothermal and solar-based processes.

The proposed invention has a maximum power density 60Wm⁻² which is significantly higher than liquid-based thermal-electric energy-based systems (<10Wm⁻²). The energy density was 453 Whm⁻³ which was higher than current reverse electrodialysis systems (118 Whm⁻³).

Next Steps

Patent 10,431,842 issued 10/1/2019. Seeking licensing partners.

TECHNOLOGY READINESS LEVEL

1-3

Seeking

Investment | Licensing | Research

Keywords

- waste heat
- clean energy
- thermal regenerative battery
- thermal-electric energy conversion

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