Caloric Cooling

Ames Laboratory designs, discovers, and deploys new materials that can create temperature changes – caloric effects – for advanced solid-state refrigeration. The goal is to save up to 30 percent in energy usage in new refrigerators.

Ames Laboratory's team integrates Artificial Intelligence (AI) methods to speed up the materials discovery process by screening tens of thousands of potential systems that could be engineered to generate cooling when acted upon by magnetic, electric or mechanical forces. Benefiting from a large array of both published and internal data (both experimental and in-house theory derived accurate but fast estimators for caloric properties used within AI to reveal outliers), screening produced a handful of promising combinations of highly-abundant elements that were used to prepare and characterize a number of novel compounds that exhibit the best caloric effects known today.

Ames Laboratory welcomes participation of industry partners interested in employing these new materials in the next-generation, highly-efficient solid-state caloric-cooling devices.

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