Magnetic Cooling : Camfridge achievements and industry challenges

N. Wilson*

Camfridge Ltd, Unit B1, Copley Hill Business Park, Babraham, Cambridge, CB22 3GN, UK
*Corresponding author. E-mail: nwilson@camfridge.com

Magnetic cooling will only be commercially viable if it can deliver enhanced appliance efficiency; for mass-market adoption this means improvements in efficiency over gas-compressor based applications.

The highest level of efficiency currently defined for domestic cooling appliances sold within the EU is A+++. It is possible to apply this definition of efficiency, as defined within the EU regulatory framework, to a magnetically cooled appliance.

By decomposed the appliance into components - refrigerant, regenerator, motor, pump, external heat exchangers, insulation etc. - minimum necessary target efficiencies can be defined for each component so as to achieve overall system efficiency goals. There is not a unique solution to this decomposition, so the presentation will focus on Camfridge's particular design choices and their rationale. Progress against target will be outlined.

Component analysis only goes so far, as the desired level of system level efficiency is only achieved if component integration is successful. The latest version of Camfridge's magnetic cooling engine operating in a domestic fridge appliance will also be examined and compared to performance targets.

The final part of the presentation will focus on what remains to be achieved.