Intensifies the sorption capacity and thermal performance of adsorption systems for cooling and heat storage

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Short Biography

Ahmed is a Senior Lecturer (Associate Professor) of Thermal-Fluid Sciences in Mechanical Engineering, and his mainstream research is in sustainable & Zero-carbon heating and cooling technologies and heat storage. Ahmed has a vast experience in sorption systems, primarily physical sorption in cooling and heat storage. Ahmed has been undertaking research projects in the UK and in collaboration with other countries (e.g., Japan, Rwanda, Kenya, Nigeria, Ethiopia, Ghana and Egypt) on these research topics. Ahmed is a Principal Investigator within the Energy and Bioproducts Research Institute (EBRI). His PhD/DPhil in adsorption cooling systems was awarded in December 2012. He has extensive first-hand research experience in thermal systems modelling and optimisation. He developed several adsorption/desiccant systems modelling approaches, which have been widely adopted. He worked in 1D coupled with 3D system modelling to study and optimise the energy recovery in internal combustion engines. Ahmed's research outcomes have been published in several reputable journals.

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Abstract

The increasing demand for cooling escalates the stress on the environment due to the associated carbon emissions due to their operation and the utilisation of harmful refrigeration of long-lasting global warming and ozone-depleting effects. More research is needed to promote using natural refrigerants-based refrigeration systems and provide renewable energy access to meet the increasing cooling demand with minimal environmental impact. Sorption systems are the most feasible for refrigeration and – or thermal energy storage. However, given their intermittent thermal profiles, more material-level development is required to miniaturise their physical footprint and speed their thermal response. Developing functional sorption composites of advanced heat transfer and sorption performance is inevitable. Therefore, we endeavour to develop new materials, repurpose others, and incorporate them into efficient sorption composites. Such research emphasises above and below-zero evaporator designs to broaden the application of such materials and composites to be presented.