Thermal Property Enhancement of Phase Change Materials (PCMs) by Addition of Expanded Graphite

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Thermal storage is an effective method to improve the energy efficiency of buildings, reducing the environmental impact of this sector that alone causes 30% of greenhouse gas emissions and 40% of the overall world energy consumption. Storing energy as latent heat through Phase Change Materials (PCMS) allows significant reduction to the large volumes of storage required by the traditional systems based on sensible heat. Thus, these materials have been deeply studied in the last years, in order to try to enhance their efficiency.

In these work, two different new generation fatty acid PCMs, *i.e.* lauric acid and myristic acid, are studied both pure and added with expanded graphite (G-PCM). The aim of distributing graphite inside the material is enhancing the thermal conductivity and thus speed up the processes of heat storage and retrieve. Here, latent heat and thermal conductivity of G-PCMs and of their base (fatty acid) are compared, showing the good capabilities of G-PCMs to enhance the thermal storage in buildings. Latent heat is measured by both DSC and pASC techniques, highlighting their differences in representing the phase change, while thermal conductivity is measured by a hot disk technique.

References

[1]. Kahwaji et al. Solar Energy Materials and Solar Cells 167 (2017) 109-120.