

## Highly Efficient Phase Change Materials (PCMs) for Building Applications

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30% of greenhouse gas emissions and 40% of the overall world energy consumption is due to the building industry [1]. The strict need to reduce global warming and energy consumption has given a strong impulse in the development of sustainable and energy efficient buildings. Amongst others, thermal storage is an effective method to improve the energy efficiency of buildings, reducing environmental impact. Traditionally, energy is stored as sensible heat, requiring large volumes. This storage volume can be significantly reduced when energy is stored as latent heat, through Phase Change Materials (PCMS). In the last years, these materials have been deeply studied, in order to try to enhance their efficiency. Amongst others, one solution is given by mixing PCMs (as paraffins) with different compounds, as metallic foams. In this work, a new generation of PCMs, made by fat acid mixed with expanded graphite (G-PCMs), is presented. This new type of PCMs allows a faster heat storage and retrieve, due to the graphite distribution inside the material that improve thermal conductivity. Here, latent heat and thermal conductivity of G-PCMs and of their base (fat acid) are compared, showing the good capabilities of G-PCMs to enhance the thermal storage in buildings.

### References

[1] Administration USEI. How much energy is consumed in residential and commercial buildings in the United States? United States of America, June 2014.