

Biobased Lamb Tail Fat Phase Change Material with Enhanced Thermal Properties by Incorporation of Cyclophosphazene Additives

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Abstract

Among organic phase change materials, paraffin is most commonly used, but it is not environmentally friendly due to its petrochemical content. For efficient utilization of solar or thermal energy, new phase change materials are urgently needed, or it is necessary to improve the thermal properties of existing materials. Therefore, the utilization of lamb's tail fat as a latent heat storage material is of particular importance for the evaluation of bio based waste oils. T-history is one of the simplest and most reliable and the simple equipment setup and reliable results make the T-History method attractive. In this study, new phase change materials were improved by using different concentrations of cyclophosphazene derivatives as an additive to the starting lamb tail fat material. According to the results, 1% HEHCP-doped lamb tail fat can be proposed for application in thermal energy storage systems when used for insulation. In addition, it is found that if the phase change materials developed by inclusion of HBACP can be operated as cooling liquid for photovoltaic panels or as working fluid in concentrated solar power systems, owing to higher fusion of heat value of 1% HBACP and higher specific heat capacity of 2% HBACP consisting lamb tail fat.

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