

FLAMMABILITY CHARACTERIZATION OF
FAT AND OIL DERIVED PHASE CHANGE MATERIALS

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ABSTRACT

Phase change materials are a quickly growing commodity in a world which now places a premium on energy conservation, and renewable energy sources. The implementation of PCMs into several world markets can lead to reduced energy costs, and increased opportunity to take advantage of alternative energy sources, such as solar and wind power. Understanding the flammability characteristics of PCMs will increase the ability to adequately introduce these materials into these markets, which may be very sensitive to flammability concerns, such as building construction. This thesis is a discussion of a project designed to determine flammability relationships for many fat and oil derived PCMS, and to compare these to the current market's dominant PCM, paraffins. The results were similar to what was expected; the flammability of the PCMs is directly linked to the materials flash point, i.e. the material with the lower flash point will have a lower propensity to burn. To accompany this, it was also determined that the flash point of each material could be directly linked to both the materials boiling point and molecular weight; both have a positive linear relationship. Based on these results, it was concluded that PCMs derived from fats and oils have a lower propensity to burn than petroleum derived paraffins.